

The archaeometric study of ceramic materials in JCR journals and conference proceedings during the last decade (2000-2010)

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Ceramic is the oldest synthetic material created by the mankind and has been present in human societies from around ten thousand years ago. During the last few decades, within the research field of Archaeometry, the study of archaeological and historical ceramic materials has experienced a significant increase in the application of chemical-physical techniques to obtain information on technology and production of these materials in the past. This paper presents the results obtained in a bibliometric study undertaken on 589 articles published on this subject in JCR journals and conference proceedings during the last decade (2000-2010). The main purpose of this research was to address the recent evolution and trends of this kind of investigations. The parameters analyzed were: date of publication, type of journal, topic, cultural-chronological classification of materials studied, origin country of authors, and analytical techniques used. Resulting data indicated a continual, stable, and growing publication rate on the subject in journals and conference proceedings of the three JCR indexes, namely SCI, AHCI, and SSCI, which evidences a high level of interdisciplinarity. Authors from Europe and the United States carried out the majority of contributions.

Key words: Ceramics, pottery, archaeometry, bibliometric study, JCR journals, JCR conference proceedings

El estudio arqueométrico de materiales cerámicos en revistas y actas de congresos de los JCR durante la última década (2000-2010)

La cerámica es el material sintético más antiguo creado por el hombre y ha estado presente en las sociedades humanas desde hace más de diez mil años. Durante las últimas décadas, dentro del campo de investigación de la Arqueometría, el estudio de materiales cerámicos arqueológicos e históricos ha experimentado un aumento significativo en la aplicación de técnicas químico-físicas para obtener información sobre la tecnología y la producción de estos materiales en el pasado. Este trabajo presenta los resultados obtenidos en un estudio bibliométrico realizado en 589 artículos sobre este tema publicados en revistas y actas de congresos de los JCR durante la última década (2000-2010). El objetivo principal de esta investigación consistió en conocer la evolución y tendencias recientes de este tipo de estudios. Los parámetros analizados fueron: año de publicación, tipo de revista, tema, clasificación cultural y cronológica de los materiales estudiados, país de origen de los autores y técnicas analíticas utilizadas. Los resultados indicaron una publicación continuada, estable y creciente de artículos sobre este tema en revistas y actas de congresos pertenecientes a los tres índices de los JCR, a saber SCI, AHCI y SSCI, lo cual evidencia un alto grado de interdisciplinaria. La mayoría de contribuciones las realizaron autores europeos y norteamericanos.

Palabras clave: Cerámica, materiales cerámicos, arqueometría, estudio bibliométrico, revistas JCR, actas de congresos JCR

1. INTRODUCTION

Ceramic was the first synthetic material created by the human being. The oldest pottery recipients date from around ten thousand years ago and appeared in Neolithic times. These items are the result of simple manufacture processes and very often deals with containers used to storage the surplus of crops produced by the practice of agriculture. Since then, pottery was widely used to the extent of being almost an ubiquitous material in most archaeological sites from early chronologies.

During the last few decades, the study of archaeological and historical ceramic materials has experienced a significant increase in the application of chemical-physical characterization techniques to solve questions concerned, among other aspects, with technology or raw materials processed to make them. The application of such techniques to solve this kind of

questions lies within the research field of Archaeometry.

This paper presents the results of a bibliometric study undertaken on all the archaeometric articles published ($n = 589$) on archaeological and historical ceramic materials in JCR (*Journal Citation Reports*) journals and conference proceedings during the last decade (2000-2010). The main purposes of this research were to know the recent evolution and trends of archaeometric studies on ceramic materials and to highlight goals and key points of such investigations. Similar bibliometric studies have been also accomplished for archaeometric investigations on archaeological and historical glasses covering the period between 1987 and 2008¹, and also for archaeometric Spanish studies on ceramic materials between 1972 and 1995².

TABLE I. NUMBER OF ARTICLES CONSULTED AND JOURNALS IN WHICH THEY WERE PUBLISHED. SCI: SCIENCE CITATION INDEX. SSCI: SOCIAL SCIENCES CITATION INDEX. AHCI: ARTS AND HUMANITIES CITATION INDEX.

Journal	SCI	SSCI	AHCI	Number of articles
Abstracts of Papers of the American Chemical Society	X			1
Accounts of Chemical Research	X			1
Acta Chimica Slovenica	X			1
American Antiquity		X	X	4
Analyst	X			1
Analytica Chimica Acta	X			12
Analytical and Bioanalytical Chemistry	X			6
Analytical Letters	X			1
Applied Clay Science	X			11
Applied Physics A	X			24
Applied Radiation and Isotopes	X			1
Applied Spectroscopy	X			1
Applied Surface Science	X			3
Arabian Archaeology and Epigraphy			X	1
Arabian Journal for Science and Engineering	X			1
Archaeology in Oceania			X	1
Archaeometry	X		X	70
Archivo Español de Arqueología			X	1
Boletín de la Sociedad Española de Cerámica y Vidrio	X			6
Bulletin of the Peabody Museum of Natural History	X			1
Chemija	X			2
Chimia	X			1
Chinese Physics C	X			1
Chinese Science Bulletin	X			2
Chungara, Revista de Antropología Chilena		X		2
Clays and Clay Minerals	X			1
Earth Planets and Space	X			1
Electroanalysis	X			1
Estudios Atacameños			X	1
European Journal of Mineralogy	X			2
European Journal of Science and Theology			X	1
Geoarchaeology: An International Journal	X		X	10
Hemjska Industrija	X			2
Hesperia			X	2
Historical Archaeology			X	1
Hyperfine Interactions	X			21
Indian Journal of Pure & Applied Physics	X			3
Instrumentation Science & Technology	X			2
Interiencia	X			1
International Journal of Historical Archaeology			X	1
International Journal of Nautical Archaeology			X	1
International Journal of Thermophysics	X			2
Intersecciones en Antropología		X	X	2
Ionics	X			1
Journal of African Archaeology			X	2
Journal of Analytical Atomic Spectrometry	X			3
Journal of Anthropological Archaeology		X	X	2
Journal of Applied Physics	X			5
Journal of Archaeological Science	X	X	X	77
Journal of Cultural Heritage	X		X	12
Journal of Field Archaeology			X	4
Journal of Geophysical Research-Solid Earth	X			1
Journal of Hazardous Materials	X			1
Journal of Molecular Structure	X			4
Journal of Nano Research	X			5
Journal of Non-Crystalline Solids	X			2
Journal of Physics-Condensed Matter	X			2
Journal of Radioanalytical and Nuclear Chemistry	X			20
Journal of Raman Spectroscopy	X			26
Journal of the American Ceramic Society	X			8
Journal of the American Society of Japan	X			1
Journal of the European Ceramic Society	X			7
Journal of the Polynesian Society		X		1
Journal of Thermal Analysis and Calorimetry	X			8
Latin American Antiquity			X	5
Lithuanian Journal of Physics	X			1
Materiales de Construcción	X			1
Materials and Manufacturing Processes	X			2

Journal	SCI	SSCI	AHCI	Number of articles
Materials Characterization	X			3
Materials Science and Engineering A	X			1
Mediterranean Archaeology & Archaeometry			X	1
Microchemical Journal	X			10
Micron	X			1
North American Archaeologist			X	3
Nuclear Instruments and Methods in Physics Research A	X			2
Nuclear Instruments and Methods in Physics Research B	X			20
Nukleonika	X			1
Optical Materials	X			1
Periodico di Mineralogia	X			4
Phase Transitions	X			2
Philosophical Magazine	X			1
Physica B-Condensed Matter	X			3
Physics and Chemistry of Minerals	X			1
Plains Anthropologist		X		3
Powder Diffraction	X			2
Proceedings of the National Academy of Sciences of the USA	X			2
Progress in Natural Science	X			1
Quimica Nova	X			2
Radiation Measurements	X			3
Radiation Physics and Chemistry	X			1
Radiochimica Acta	X			3
Revue du Nord			X	1
Revue Roumaine de Chimie	X			1
Romanian Journal of Physics	X			1
Science in China Series E-Technological Sciences	X			1
Science	X			1
Scientific Research and Essay	X			1
Spectrochimica Acta Part A	X			3
Spectrochimica Acta Part B	X			4
Spectroscopy and Spectral Analysis	X			6
Spectroscopy	X			1
Studia Universitatis Babes-Bolyai Chemia	X			1
Surface and Interface Analysis	X			2
Surface Engineering	X			4
Talanta	X			4
Thermochimica Acta	X			1
Transactions of the Indian Ceramic Society	X			1
Vibrational Spectroscopy	X			3
World Archaeology			X	1
X-Ray Spectrometry	X			14
Conference Proceedings				55
Total	88	7	23	589

Experimental scientists, historians, and archaeologists have mainly approached ancient ceramics as a research subject in accordance with some of the following objectives:

1. Characterization of ceramic materials to trace the geographical provenance of raw materials employed in their manufacture, as well as to determine the firing processes carried out^{3,4}.
2. Simulation and synthesis of ancient ceramics from modern raw materials in order to identify their production technology⁵.
3. Study of the degradation mechanisms experienced by ancient ceramics as a consequence of burial or exposition to different environmental factors⁶.

The parameters analyzed in all the 589 articles were: date of publication, type of journal, topic, cultural-chronological classification of materials studied, origin country of authors and chemical-physical analytical techniques used.

2. METHODOLOGY

To undertake this bibliometric study, the articles on archaeometry of ceramic materials published in the main international JCR journals and conference proceedings were consulted through the Web of Science, independently of the index to which they are assigned (Tab. I). Main searching criteria used were the words *Pottery* and/or *Ancient Ceramics* since both were the most restricted terms to find contributions on archaeometry of ceramic materials. Other more general words such as *Archaeometry* and/or *Ceramics* were rejected due to the searching outputs for these words were always extensive and, consequently, the information obtained was huge and very difficult to process. Data outputs from *Pottery* and *Ancient Ceramics* were later refined case by case to eliminate those records which did not correspond with the general topic on archaeometry of ceramic materials. That is, those articles which did not employ chemical-physical techniques to study archaeological or historical ceramic materials. In addition, those articles whose main subject was absolute dating were not taken into consideration.

The study was focused on the last decade, from 2000 to 2010, which comprises eleven years in total. It was considered that either the period of time or the amount of articles consulted were representative enough to reach some outstanding conclusions on recent evolution and trends in this kind of approaches. In any case, the main purpose of the present bibliometric study was to assess general trends and habits on archaeometric studies of ceramic materials rather than undertaking an exhaustive quantitative research. That means that, under those criteria taken into consideration to carried out this work, some minor articles could be missed during the searching tasks.

To evaluate the articles consulted, a data base with all the seven parameters mentioned above was built. This file made easy the latter statistical treatment of the data set gathered.

3. RESULTS AND DISCUSSION

3.1. Date of publication

The first parameter analyzed was the article date of publication. This parameter showed a continual, stable and growing publication rate (from 28 articles in 2000 to 67 in 2010) with two noticeable peaks in 2004 (69 articles) and 2009 (78 articles, the higher number of publications), respectively. The year which showed the lower amount of contributions was 2001 with only 22 articles (Fig. 1). The number of publications in the period 2000-2005 is 260 (43.3 articles per year), while in the period 2006-2010 the number is 329 (65.8 articles per year), which clearly indicates that this research line has grown and expanded in the last decade, above all in the last five years.

The total number of articles ($n = 589$) involved an average of 53.5 articles per year in the topic of archaeometry of ceramics in the last decade. In order to know the relative significance of this value, it was contrasted with the total number of articles found for the same period of time in the general topic of *Ceramic Materials* and also in the particular topic of *Refractories*. This later was chosen because is a very dynamic field of research within the more general topic of ceramic materials and has the advantage that it associates the diversity of studies concerned with refractories. That is, on the whole, all the studies devoted to any topic related to refractories use to employ this word in the title or as a key word.

In the case of *Ceramic Materials*, a total of 15498 articles were found, whereas in the case of *Refractories* the number of articles was 1349, which means that an 8.7 % of the articles published in ceramic materials concerned with the topic of refractories (122.6 articles per year). The total number of articles in archaeometry of ceramic materials was 589, which signifies up to a 3.8 % within the general research field of ceramic materials. These data suggest, therefore, that archaeometric approaches represent a substantial importance, in relative terms, in general ceramic studies, which indicates that is currently reaching an outstanding consolidation.

3.2. Type of journal

The articles consulted were published either in experimental science journals or in journals devoted to humanities and social sciences. This gives an idea of the high level of interdisciplinarity existing in ceramic archaeometric

studies. The majority of the articles (75 %) were published in journals included in the *Science Citation Index (SCI)*⁷⁻⁹. The articles published in the *Arts and Humanities Citation Index (AHCI)*^{10,11} represented the 19 % of the total, whereas those articles published in the *Social Science Citation Index (SSCI)*¹² only showed a percentage of 6 % (Fig. 2). The articles published in humanities and social sciences journals constitute, consequently, the 25 % of the articles compiled.

It is important to emphasize that some of the journals included in more than one index were the journals which published the highest number of articles on this subject (Tab. I). This is the case of *Journal of Archaeological Science* (IF 1.847, JCR 2009, 77 articles)^{13,14}, included in the three indexes (SCI, AHCI, and SSCI); and *Archaeometry* (IF 1.355, JCR 2009, 70 articles)^{15,16}, included in two of them (SCI and AHCI). Due to the important number of contributions, the former journal has recently published a review highlighting the key role of archaeometry in the study of ancient and historical materials during the last 35 years¹⁷. Other journals included in more than one index were *American Antiquity* (AHCI and SSCI, four articles), *Geoarchaeology: An International Journal* (SCI and AHCI, 10 articles), *Intersecciones en Antropología* (AHCI and SSCI, two articles), *Journal of Anthropological Archaeology* (AHCI and SSCI, two articles), and *Journal of Cultural Heritage* (SCI and AHCI, 12 articles).

The type of journal data taken as a whole indicate not only that archaeometric studies on ceramic materials can be considered as a highly interdisciplinary field of research, but also that to be updated in the subject it is necessary to become aware of the three JCR indexes, since contributions are not exclusive of one of them. Among the 589 articles found, six articles were published in the present journal *Boletín de la Sociedad Española de Cerámica y Vidrio* during the last decade¹⁸⁻²³. Although this amount is in conjunction with values showed by top level journals in ceramic materials such as *Journal of the European Ceramic Society* (IF 2.090, JCR 2009, seven articles) and *Journal of the American Ceramic Society* (IF 1.944, JCR 2009, eight articles), it would be advisable to publish at least one article per year to be consonant with current international trends observed in this subject.

3.3. Article topic

According to the objectives, the articles were classified into three topics:

- a) *Characterization*. They were those articles in which chemical-physical analyses were used to determine composition and properties of the ceramics studied.
- b) *Simulation*. They were articles focused on preparation of a simulated ceramic material to determine, by comparison, raw materials and technological processes employed in production of ancient ceramics.
- c) *Conservation*. The articles grouped in this topic studied the alteration mechanisms experienced by ancient ceramic materials due to interaction with external agents, during burial in the case of archaeological pottery or by exposition to atmospheric and weathering agents in the case of some historical ceramics.

Almost the total of the articles consulted (97 %) belonged to the *Characterization* topic (Fig. 3a). Only a 2 % of them covered the *Simulation* topic, which means that unfortunately

it is not common the use of similar modern clay materials to check the characterization data obtained. On the other hand, the number of contributions concerned to *Conservation* was very few (1 %), which could be due to the fact that most of the low temperature ancient ceramic materials studied are thermodynamically stable in natural environments during burial, as well as under other kinds of environment, e.g. in the air. Nonetheless, post-depositional and environmental alterations are well-known phenomena in literature^{13,24}.

A more detailed picture is given in Fig. 3b on articles included in the *Characterization* topic, which were additionally classified according to the main focus of the characterization analyses undertaken. Thus, it can be stated that a little more than a half of the papers (54 %) were focused on chemical analysis to determine the composition of potsherds, mostly with the aim of establishing geographical provenance groups using statistical or chemometric treatment of data. Those articles focused on structure represented the 33 %; while the studies mainly devoted to observation and thermal analysis only reached the 5 % and the 3 %, respectively, of the total. A 5 % of articles did not show any specific focus on one of these major categories.

3.4. Cultural and chronological classification of ceramic materials

Ceramic samples studied and analyzed in the articles compiled came from a wide variety of geographical locations. For this reason, a cultural classification was first made to better contextualize the samples.

Fig. 4 shows that most of the samples studied belonged to the *Euro-Asian Culture* (59 %), followed to a considerable distance by the *pre-Columbian American Culture* (17 %). The rest of cultures (*Eastern, African, and Pacific*) were represented in a much lower proportion. As a result of the high number of samples included in the *Euro-Asian Culture*, an additional classification based on chronology of samples was made using *Euro-Asian Culture* data.

In Fig. 5 it can be observed that the most studied ceramics in *Euro-Asian Culture* data were classified into the *European Prehistory* period. This is not surprising since archaeometric characterization studies use to be almost the only way to approach matters related to raw materials or technology in the oldest ceramic materials. Roman and Medieval samples were also quite abundant and presented a pattern similar to that observed in archaeometric studies of ancient glasses¹. The category of modern and contemporary ceramics showed a noticeable second place due to the number of articles devoted to the study of ancient porcelains.

The number of articles taken either in the cultural or in the chronological classifications showed an important correlation with the origin country of authors who published them, as is discussed in the next section.

3.5. Origin country of authors

To classify the provenance of authors it was taken, as origin country, that which appeared in filiations in the title page of the articles.

Resulting data (Fig. 6) indicated that the countries with the highest number of contributions are the United States and Italy, both with 122 articles. Apart from other geographical locations, the North-American authors basically studied

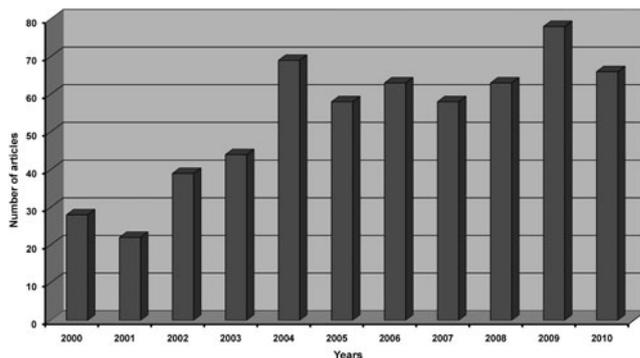


Figure 1. Number of articles on archaeometric studies of archaeological and historical ceramics in the period 2000-2010 (n = 589).

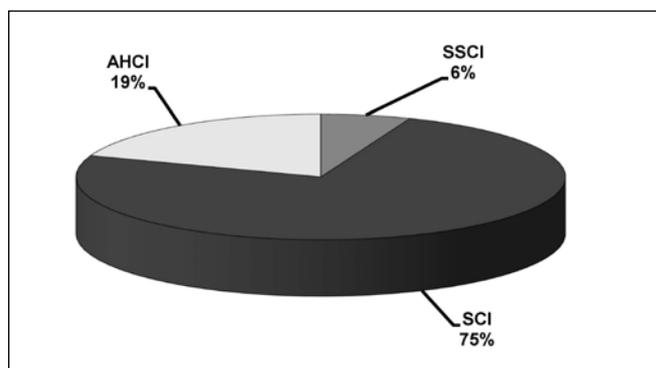


Figure 2. Percentage of articles according to the three JCR indexes. SCI: Science Citation Index. AHCI: Arts and Humanities Citation Index. SSCI: Social Sciences Citation Index.

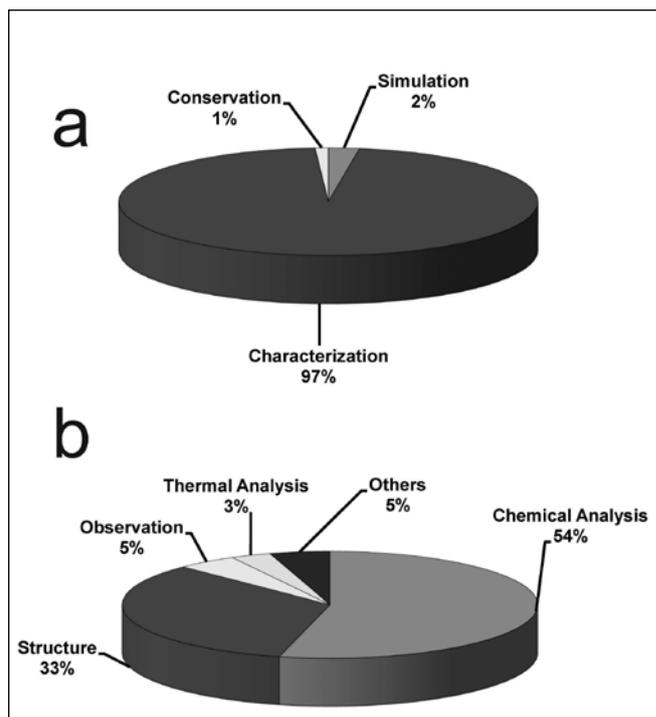


Figure 3. a) Percentage of articles according to their topic. b) Distribution of *Characterization* articles according to their main focus of analysis.

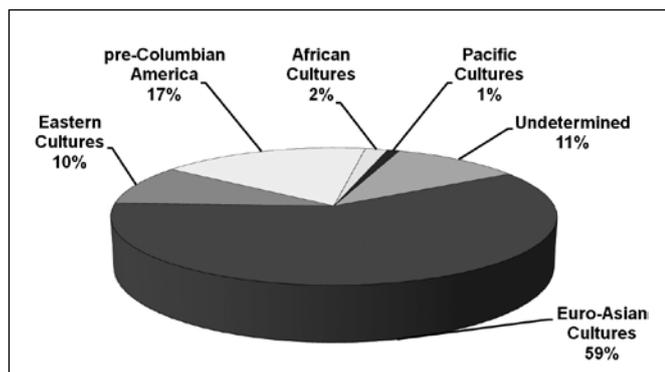


Figure 4. Cultural classification of samples studied in the articles.

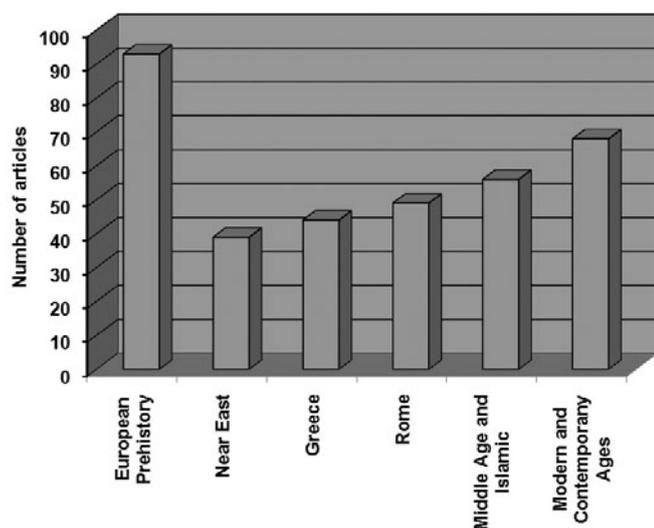


Figure 5. Chronological classification of samples studied in Euro-Asian Culture articles.

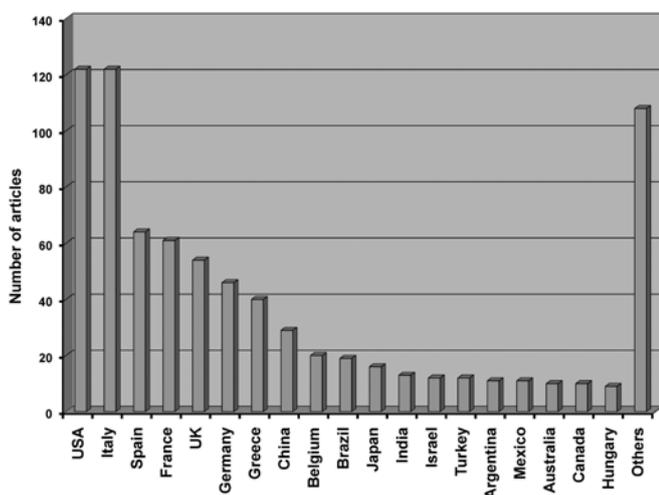


Figure 6. Distribution of origin country of authors.

ceramic samples from *pre-Columbian American Cultures*²⁵, whereas Italy was the European country with the highest number of articles, probably because most of the samples of characterization analyses came from the *Euro-Asian Culture* and, mainly, from Roman times²⁶.

The third position in this ranking was occupied by Spanish authors. Together with other European countries such as France, the United Kingdom, Germany and Greece, Spain formed a compact group after the United States and Italy. The number of articles in this group ranged from 40 for Greece to 64 for Spain, which indicates an extraordinary increase of publications signed by Spanish authors in comparison with the situation stated 15 years ago². After this European group the next country was China, which occupied the eighth place with 29 articles.

The category of *Others* in Fig. 6 collected those countries with less than nine articles. Some of these countries were Syria (eight articles), Austria (seven articles), Iran (five articles), Czech Republic (four articles), Poland (three articles) or Russia (two articles).

An overall evaluation of these data indicates that archaeometric research on ancient ceramic materials is currently done in Europe (mainly concentrated in Italy, Spain, France, the United Kingdom, Germany, Greece, and Belgium) and the United States, that is, in two of the three worldwide powers of scientific research development. In this arena it must be highlighted the eleventh position of Japan, the third worldwide scientific power, with only 16 archaeometric articles in the last decade, probably because Japanese authors do not find a high degree of innovation in this field of research.

If results obtained for ancient ceramics in this bibliometric study are compared with those obtained for ancient glasses in a previous work¹, it can be verified that in both cases Italy provided the highest number of authors. However, it must be pointed out a different trend. The articles from the United States were very abundant on ceramic materials but were very few on glasses. This may be explained by the fact that glass materials were not produced in *pre-Columbian American Cultures*. For the rest the first five European countries were the same in both cases (ancient ceramics and ancient glasses), even though Spain occupied the third position in the case of glasses.

3.6. Analytical techniques used

The analytical techniques used in the articles compiled were classified into three categories: a) observation and thermal techniques; b) chemical techniques; and c) structural techniques (Fig. 7).

Among the observation techniques, SEM and thin-section petrographic examination were the most used, probably due to their availability and suitability for studying ceramic materials (Fig. 7a, see caption of this figure for abbreviations of techniques). SEM results useful to observe the microstructure at high magnifications²⁷ and may be attached to an EDS spectrometer to chemically micro-analyze particular areas of the sample. On the other hand, the petrographic examination is carried out by previous preparation of a thin-section, which is observed by a transmitted-polarized light microscope to determine the mineralogical composition of the ceramic sample. It also provides additional information on surface treatments, particle orientation, and granulometric features of raw materials. Conventional reflected light optical microscopy

was the third more used observation technique, while TEM is barely used in twenty articles to identify nanoparticles in decoration pigments. Thermal techniques showed a quite low level of use mainly represented by differential thermal analysis (DTA) usually coupled with thermogravimetric analysis (TGA).

As far as chemical techniques are concerned XRF, INAA, and ICP were the most employed²⁸, whereas other more complex techniques such as PIXE, PIGE, LIBS or EXAFS, a kind of X-ray absorption spectroscopy, displayed a less frequency of use²⁹ (Fig. 7b). The first group of techniques is usually employed to determine bulk chemical composition of ceramic sherds. They need, therefore, a small ceramic sample which is destroyed to undertake the analyses. When a high amount of samples can be or need to be analyzed, multivariate statistical techniques are then used to establish provenance groupings based on chemical profiles. On the contrary, the second group of techniques is more commonly employed in those samples which can not be destroyed or when only some areas of the surface need to be analyzed. In any case, a particular feature of ancient ceramic materials is abundance, since recycling is not common due to the relative easy access to raw materials. This allows a higher using of these techniques in comparison with other more precious materials such as ancient glass, in which availability of samples is normally very limited.

Finally, the category of structural techniques was clearly dominated by the use of XRD which, obviously, results a key analytical technique for analyzing polycrystalline materials such as ceramics (Fig. 7c). In addition, Raman and FTIR also showed noticeable frequencies of use, especially in the analysis of pigments and surface decorations. Mössbauer spectroscopy was also quite used in the study of ancient ceramics to determine the oxidation state of iron and, consequently, to provide some information on ceramic colours. Other analytical techniques such as TOF neutron diffraction³⁰ are still barely used, while NMR (nuclear magnetic resonance) or XANES (X-ray absorption near edge structure) only displayed a punctual use in the articles compiled. For this reason they were not taken into consideration in Fig. 7.

Overall, it was stated the employ of destructive against non-destructive techniques when the main goal of the research is to look for provenance of ceramic materials through chemical composition. If the main focus is to investigate technological aspects the techniques more often used are generally non-destructive and sometimes directed to surface rather than to bulk ceramic artefacts.

4. CONCLUSIONS

Resulting data derived from the bibliometric study carried out showed that archaeometric research on ancient ceramic materials is published with a continual, stable, and growing rate (from 28 articles in 2000 to 67 in 2010) in JCR journals and conference proceedings during the last decade (2000-2010, both years included). The articles are published in journals belonging to the three JCR indexes, namely SCI, AHCI, and SSCI, which clearly evidences the high level of interdisciplinarity existing in this kind of studies. Most of the articles (75 %) appeared in the SCI index, whereas those in both the AHCI and SSCI indexes represented 25 %. This means that to be updated in this field of research it is necessary to

become aware of contributions published in the three indexes. It also indicates that journals included in humanities and social sciences indexes represent a narrow editorial space to publish these archaeometric studies and, consequently, an important amount of articles take the way of the SCI index to be eventually published.

The majority of the studies are focused on chemical-physical characterization and, particularly, on compositional chemical analysis to explore geographical provenance of ceramic materials. Those concentrated on conservation and simulation displayed a very low percentage (1 % and 2 %, respectively).

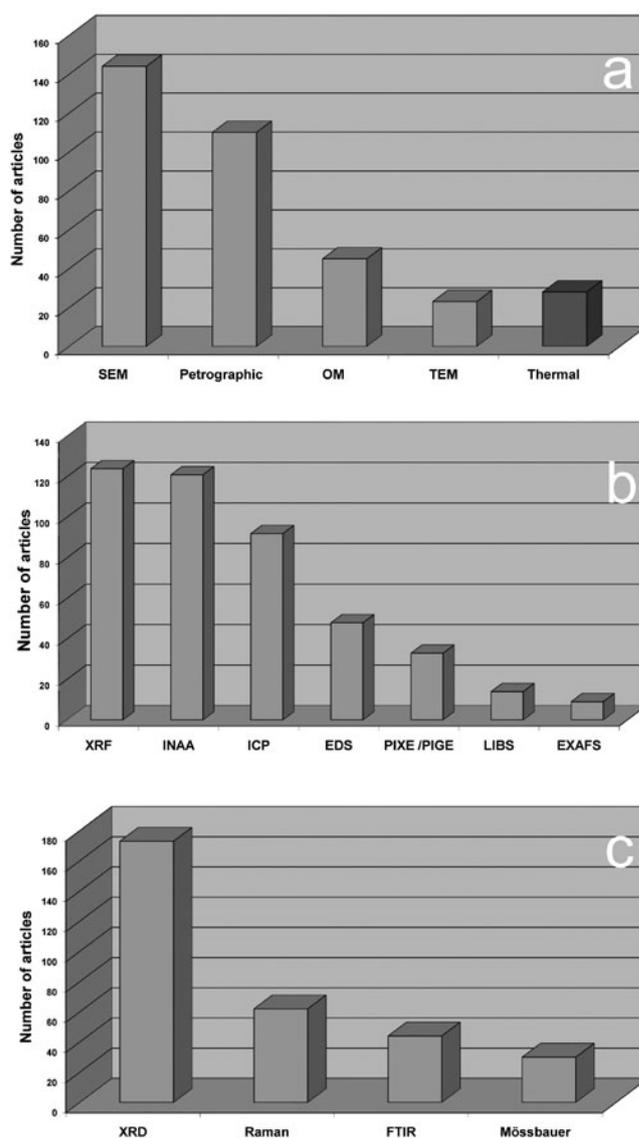


Figure 7. Distribution of the analytical techniques used. a) Observation and thermal techniques. SEM: scanning electron microscopy. OM: optical microscopy TEM: transmission electron microscopy. b) Chemical analysis techniques. XRF: X-ray fluorescence. INAA: instrumental neutron activation analysis. ICP: inductively coupled plasma. EDS: energy dispersive X-ray spectroscopy. PIXE: proton induced X-ray emission. PIGE: proton induced Gamma-ray emission. LIBS: laser induced breakdown spectroscopy. EXAFS: extended X-ray absorption fine structure. c) Structural techniques. XRD: X-ray diffraction. FTIR: Fourier transformed infra-red spectroscopy.

Although ceramic materials analyzed came from a wide variety of geographical locations, most of them were classified into the Euro-Asian culture category. Apart from Near East, Greek-Roman, and Medieval times, prehistoric and modern-contemporary were the ceramic materials more frequently investigated. Pre-Columbian American materials have been also widely studied. The provenance of materials is strongly connected with nationality of authors, since the United States and Italy are the countries which published the highest number of archaeometric articles. The highest European producers of archaeometric contributions are, in this order, Italy, Spain, France, the United Kingdom, Germany, and Greece. That means that archaeometric research on archaeological and historical ceramic materials is currently done in Europe and the United States. Japan, the third worldwide power in scientific research, is scarcely represented in the development of archaeometric approaches since it occupies the eleventh position in number of articles according to the origin country of authors. Finally, observation, chemical, and structural techniques are the common tools used to undertake this kind of studies. Overall, it has been stated a higher use of destructive techniques when the main research goal is provenance of ceramic materials, while technological aspects are very often approached through non-destructive or surface techniques.

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