

to approximately 30 Primarily Undergraduate Institutions (PUIs); offering training workshops, focusing upon utilization of the CSDS in chemistry education, to faculty at these PUIs; collaborating with the Cambridge Crystallographic Data Centre (CCDC) to build teaching modules making effective use of the CSDS; and encouraging faculty to prepare their own teaching modules. Details regarding the NSF-DCF project and examples of CSDS related chemistry teaching modules will be presented.

Keywords: education, database, e-learning

P28.01.01

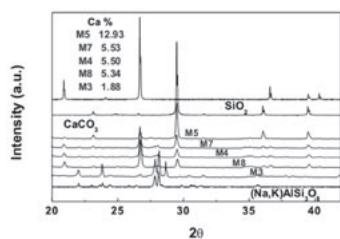
Acta Cryst. (2008). A64, C634

X-ray diffraction applied to calcium determination in Mexican clays for Talavera production

Raul Delgado-Macuil¹, Marlon Rojas-Lopez¹,
Valentin Lopez-Gayou¹, Abdu Orduna-Diaz¹, Xim Bokhimi²,
Manuel Aguilar²

¹Instituto Politécnico Nacional, CIBA, Carretera Estatal Santa Ines Tecuexcomac-Tepetitla Km. 1.5, Tepetitla de Lardizabal, Tlaxcala, 90700, Mexico, ²Universidad Nacional Autonoma de Mexico, Facultad de Fisica, Mexico D.F., E-mail: rdmacuil@yahoo.com.mx

Eight types of clays used by the craftsmen of Tlaxcala Mexico, in the elaboration of the recognized world-wide level Mexican Talavera ceramic, were analyzed (M1-M8). The presence of calcium, iron and feldspars, in the samples, gives to the clay, malleability in its handling and hardness. EDX spectra of analyzed clays, showed the presence of: calcite (CaCO₃), quartz (SiO₂) and the feldspar ((Na,K)AlSi₃O₈). EDX results, in atomic percentage, showed that only a half of the samples had Ca and Na (M4, M5, M7 and M8). And M3 is the sample with the higher feldspar concentration. The sample M5 was the only one that showed to have the best relation between these three components (CaCO₃, SiO₂, (Na, K)AlSi₃O₈). The clay samples were also analyzed by infrared spectroscopy in diffuse reflectance mode (RD-IR), in which several absorption bands associated to Ca-O bonds were observed. In particular, a band located at 1795 cm⁻¹ increase in intensity in proportional form with the calcium content. This result is in agreement with EDX results. From these results, a correlation function between EDX and RD-IR was obtained, to evaluate in a practical form the calcium content.



Keywords: X-ray diffraction, clays, infrared spectroscopy

P28.01.02

Acta Cryst. (2008). A64, C634

X-ray characterization of the early Islamic reddish luster painted pottery

Sanae Miura¹, Norihiro Kato¹, Izumi Nakai¹, Yoko Shindo²

¹Tokyo University of Science, Science, 12-1 Ichigayafunagawaramachi Sinnjyuku-ku, Tokyo, Japan, Shinjyuku, Tokyo, 162-0826, Japan, ²Middle Eastern Culture Center, 3-10-31 Osawa, Mitaka-shi, Tokyo, 181-0015, Japan, E-mail: j1307691@ed.kagu.tus.ac.jp

‘Luster’ refers to iridescent decoration on glazed pottery, produced by metal pigments on white glaze, creating a metallic copper or

gold sheen. A characteristic of luster decoration is the presence of several colors (red, olive green or brown). In this study, chemical composition of glaze and luster pigment was analyzed by XRF analysis and chemical states of the metallic elements were by XAFS. We focused on the luster pottery with reddish colored decoration which was made in Iraq, especially 9th-10th centuries. Portable XRF spectrometer, OURSTEX100FAII was taken to Egypt. A total of 3,165 luster painted potteries made in Iraq were excavated in Raya till 2005, where is an archeological site in Sinai Peninsula, Egypt (Director, Dr. M. Kawatoko). Of these, 214 pieces were accompanied with reddish-colored luster. A classification of the glaze on these 214 pieces was performed by their chemical composition. Moreover, 79 pieces, which are stored in a museum in Japan, were also studied as well. In addition, XAFS analysis was carried out using synchrotron radiation at Photon Factory, Tsukuba, Japan. The white glaze of Iraq luster pottery can be classified into alkali-lime glaze and alkali-lead lime glaze. 1) Our XRF analysis showed that 67% of the Iraq luster painted pottery with reddish color excavated in Raya was alkali-lime glaze. This proportion is much higher than that of other colored luster potteries. XAFS analysis of the museum specimens revealed the relationship between the chemical state of copper and their color. An existence of metallic copper was found only in the luster painted pottery with reddish color, among various colored decorations. As a result, it can be said that strong reducing condition was necessary for the production of the reddish luster decoration.

Keywords: archaeology, EXAFS, ceramics

P28.02.04

Acta Cryst. (2008). A64, C634–635

Building of three dimensional Escher patterns by Layer-manufacturing

Yasunari Watanabe^{1,3}, Yuji Ikegami^{2,3}, Yoshiko Murakami¹,
Kenji Yamazawa², Teshima Yoshinori^{3,4}

¹Teikyoheisei University, Information Science, 2289-23 Uruido, Ichihara, Chiba, 290-0193, Japan, ²Institute of Physical and Chemical Research(RIKEN), 2-1Hirosawa, Wako, Saitama, 351-0198, Japan, ³Interdisciplinary Institute of Science Technology and Art(ISTA), 2-5-28Kitahara, Asaka, Saitama, 351-0036, Japan, ⁴National Institute of Advanced Industrial Science and Technology (AIST), 1-2 Namiki, Tsukuba, Ibaraki, 305-8564 Japan, E-mail: wistajp@yahoo.co.jp

Three-Dimensional Escher Patterns (3DES) are built by Layer-manufacturing. Two types of solid model are presented, whose original data are designed using CADPAC2 software. In the preparation of the model building an icosahedron is considered as a basic unit of modeling, which is an isotropic regular polyhedron with the maximum facet in the five regular-polyhedrons. Several inscribed cubes in the icosahedrons can be arranged such that they form cubic lattice decorated by set of icosahedrons. Assembled icosahedrons are formed to be 3D periodic structure with overlapped region of the icosahedrons inside and icosahedrons facet outside of the assembly (Icosahedrons assembly). External of icosahedron-assembly are much available for creating the object of motif such as a body of animal that has mirror symmetry. Model building of 3DES begins with the

