

Crystal structure of zeolite A solved by precession electron diffraction tomography

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This Microporous materials like zeolites have great academic and industrial applications in catalysis because of their varying properties which are strongly related to their crystalline structure. While single crystal X-ray diffraction and powder X-ray diffraction are the main techniques for structure solution, they are limited by the small crystal sizes usually obtained during the synthesis and by strong peak overlapping, respectively. Thus, in last decades a novel method called *Electron Diffraction Tomography* (EDT) or *3D Electron Diffraction* (3D ED) has been developed allowing crystalline structure determination of nano-sized crystals performed in standard transmission electron microscopes.[1][2][3] This method can be assisted by *Precession Electron Diffraction* (PED) which minimizes dynamical effects and also provides reduction of excitation error.[4] Both techniques in combination with a continuous tilt of the crystal during acquisition of diffraction patterns can result on an almost complete reconstruction of reciprocal space. Thus, the unit cell and space group of zeolites, as well as intensities of reflections can be obtained from ED patterns, allowing the complete structure determination of the material.[5]

In this work, we have determined the complete structure of *pure silica zeolite A*, a material synthesized in our institute,[6] using a combination of EDT and PED.

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Keywords: Electron Diffraction Tomography; Precession Electron Diffraction; zeolites

This research was supported by projects RTI2018-101784-B-I00 and SEV-2016-0683-18-3 and grant PRE2018-083623 from the Spanish government.