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MS13-O2

Synchrotron X ray powder diffraction for the study of cutting edge zeolites applications

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Among the tectosilicates family, zeolites - of natural and synthetic origin - are certainly one of the most interesting one. Thanks to their peculiar microporous structure and chemistry, they have been widely used as highly efficient catalysts, adsorbents, and ion exchangers in petrochemical industries and in our daily life [1]. Beyond these traditional applications, recently zeolites are playing an increasingly important role in diverse areas, ranging from the environmental protection [2] to the advanced technological fields [3]. In particular, zeolites have found promising applications in the fields of renewable energy and environmental remediation, such as solar energy transport, thermal energy storage, CO_2 capture and water, soil treatment, etc. These applications make zeolites potential candidates as solutions to the sustainability issues in our society. This contribution will review some recent studies on the development of hybrid supramolecular structure (dyes/zeolite) suitable in Förster resonance energy transfer sensitized solar cell and luminescent solar concentrators and the use of high silica zeolites as adsorbent of emerging organic contaminant (ECOs) such as pharmaceutical active compounds and pesticides. Synchrotron X ray powder diffraction combined with other experimental techniques (infrared, UV-vis spectroscopy and liquid chromatography, etc.) and theoretical modeling–can be efficiently exploited to realistically localize the guest molecules in the zeolite pores. This multidisciplinary approach is of fundamental importance for the interpretation of the host –guest interaction at the base of the molecular organization and adsorption mechanisms.

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