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Hierarchically ordered porous titano-silicate with mesoporous and microporous pore walls for the oxidation of bulkier organic molecules

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Heterogeneous catalysis plays an important role in chemical industry for the production of fine chemicals or in the removal of hazardous contaminants. Titanium oxide or Titano-silicate with microporous (i.e. TS1 or TS2) or mesoposous (i.e. MCM types) sturcture are well known for oxidation of various organic molecules using hydrogen peroxide or molecular oxygen. Diffusional restiriction of bulkier molecules through the micro/mesopores lead to the development of macroporous solids using polystyrene templating routes. However most of the macroporous solids lacked high surface area due to amorophous pore walls. We have reported the fabrication of large surface area hierarchically ordered porous silicate maerials with pore-interconnectivity in three length scales such as microporous (pore diameter < 2 nm), mesoporous (2 nm < pore diameter < 50 nm) and macroporous (pore diameter > 50 nm) in a controlled fashion. Recently, we have further developed (i) Novel superparamagnetic hierarchically ordered porous silicate as a support for the immobilisation of lipase for bio-catalysis and (ii) V-incoporated novel hierarcially ordered porous vanado-silicate for oxidation of bulkier molecules. Herein, we report the fabrication of high surface area hierarchically ordered porous titano-silicate with (i) crystalline walls of zeolitic structure and (ii) disordered micro-mesoporous walls with dispersed Ti ions as catalytic centres for the oxidation of bulkier molecules (i.e. cyclooctene and phenanthene) to the correspondence epoxide and decomposition of organic pollutant (i.e. phenol) present in water.

Biography

Amritvir Kaur is currently pursuing her PhD at University of Central Lancashire, Preston, England under the supervision of Dr. Tapas Sen. She has completed her Bachelor's degree in Chemical Sciences from University of California. Her present study focuses on purification methods in respect to extraction of toxic & valuable metal ions from battery electrolytes and water-borne microbes from contaminated water.

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