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Synthesis and characterization of molybdena and phosphate doped silica-titania oxidative catalyst for epoxidation of styrene

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ABSTRACT

New oxidative catalysts of molybdena and phosphate doped silica-titania ($xMo/PO_4^{3-}/SiO_2$-TiO_2, x = 0, 1, 2, 4 and 5 wt%) have been prepared in this study. Silica-titania was prepared via sol-gel method by using titanium isopropoxide and tetraethyl orthosilicate as precursors of titania and silica, respectively. Sufficient amount of ammonium molybdate tetrahydrate and 0.2 M phosphoric acid were loaded on silica-titania through impregnation method. The XRD results confirmed the amorphous phase of all the samples $Mo/PO_4^{3-}/SiO_2$-TiO_2, indicating well dispersion of Mo, phosphate and Ti on the silica support. DRUV-Vis analysis revealed the existence of both tetrahedral and octahedral Ti species in the samples. The N_2 adsorption surface area analysis showed the surface area decreased with the increasing amount of doped molybdenum. The oxidation catalytic behavior of $xMo/PO_4^{3-}/SiO_2$-TiO_2 was evaluated through epoxidation of styrene using H_2O_2 as oxidant. Amongst, $5Mo/PO_4^{3-}/SiO_2$- $TiO_2$was the best oxidative catalyst which gave the highest conversion of styrene and the highest yield of styrene oxide.

| Molydena | Phosphate | Oxidative Catalyst | Silica-Titania |

Antibacterial activity of silver exchanged regenerated zeolite from Surfactant Modified Zeolite

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ABSTRACT

The antibacterial activity of regenerated zeolite NaY exchanged with silver ions was investigated. Cetyltrimethyl ammonium bromide (CTAB)-modified zeolite NaY was regenerated to original zeolite NaY using facile thermal technique and treated with sodium (Na) ions. The regenerated zeolite Y was ion exchanged with silver ions and it was tested for its antibacterial activity against *Escherichia coli* ATCC 11229 and *Staphylococcus aureus* ATCC 6538 by broth dilution Minimum Inhibitory Concentration (MIC) method. The regenerated zeolite NaY was characterized using Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy to study the structure changes as well as the stability of zeolite NaY after thermal and modification processes. The structure of zeolite NaY was stable as it did not change after the treatments. Modification of regenerated zeolite NaY with silver ions shows good antibacterial activity against both bacteria (*E. coli* and *S. aureus*) in distilled water as the antibacterial activity of studied samples increased with the increase amount of silver loaded on zeolite NaY and it was more effective against *E. coli* compared to *S. aureus*. However, the antibacterial activity of AgY was not effective in saline solution for both bacteria. The experiment showed that CTAB-modified zeolite NaY material treated at 550 ˚C could be regenerated to zeolite NaY using thermal treatment and this material had excellent performance as antibacterial agent after loaded with silver ions.

| Regenerated zeolite Y | silver zeolite | antibacterial activity | *Escherichia coli* | *Staphylococcus aureus* |