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Localized electrochemical generation of Cu and Au metallic microstructure on doped- silica surface by SECM

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Composite materials formed by copper and gold ion nanoclusters embedded in glasses were prepared via the Sol-gel method. A simple and rapid electrochemical preparation of copper and gold metallic particles is proposed using scanning electrochemical microscope (SECM). This method is not expensive and can be performed at mild conditions. The localized generation of copper and gold metallic structures on coating silica matrix has been performed by localized electro reduction of methyl vilogen and p-benzoquinon which generate reducing species which in turn diffuse towards the silica matrix and reduced the metal ions. The diameter of working electrode and electrolysis period were the main parameters and which were studied to show the effect on the size of generated dotted metallic micro patterns. The composition of the modified silica films were characterized with X-ray diffraction, SEM, optical microscope and XPS.

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Metal organic frameworks as reusable materials for organic transformations

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Metal organic frameworks (MOFs) also called as porous coordination polymers are porous crystalline materials constituted by nodes of metal ions or metal clusters held in place with rigid bi- or polypodal organic linkers, typically aromatic polycarboxylates. MOFs have received considerable attention in recent years as a new class of porous materials with high specific surface area and pore volume. These properties allow them to be one of the promising materials in gas storage for energy applications, as well as in heterogeneous catalysis. One of the additional advantages in MOFs is the ability to control the specific surface area and pore volume by adjusting the size of the ligands during synthesis. As a consequence, these materials have found many interesting applications in heterogeneous catalysis. MOFs also have the qualification of being in the porous solid family as they can be readily recovered and reused without much loss in the catalytic activity depending on the reaction conditions employed. The presentation will begin with a brief introduction of MOFs' structural characteristics, the role of ligands and various active sites responsible for catalytic reactions. The present lecture will be focussed on the results achieved using MOFs as heterogeneous catalysts in Lewis acid catalysis, aerobic oxidation and others. Further, the results attained with MOFs will be compared with other heterogeneous catalysts like zeolites and homogeneous counterparts. The selected examples will explain how one can conveniently use MOFs as heterogeneous green catalysts in achieving high conversion and selectivity by maintaining their stability. The beneficial advantages of MOFs over other heterogeneous catalysts will also be highlighted.

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