

NEW COPPER AND MIXED COPPER –PALLADIUM CATALYSTS ON SILICA SUPPORT FOR FLOW REACTIONS

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For many years, chemistry of nanomaterials has been a rapidly developing area. Nanoparticles and metal complexes attached to a carrier attract considerable interest because of its unique properties. Recently, the discovery of mesoporous silicas, such as silicagels, M-41s and SBA-15 has stimulated intensive studies of material science in the chemistry which have potential applications in catalysis, selective adsorbents, medicine, sensors and nanomaterial fabrications.

A large number of chemically important reactions of organic compounds is catalyzed by copper: azide-alkyne cycloaddition (CuAAC), Ullmann reaction, Glaser coupling, Kharash oxidation, Cadot–Chodkiewicz reaction, Sonogashira cross-coupling. Thus, the design and synthesis of such catalytic systems is relevant and practically important task.

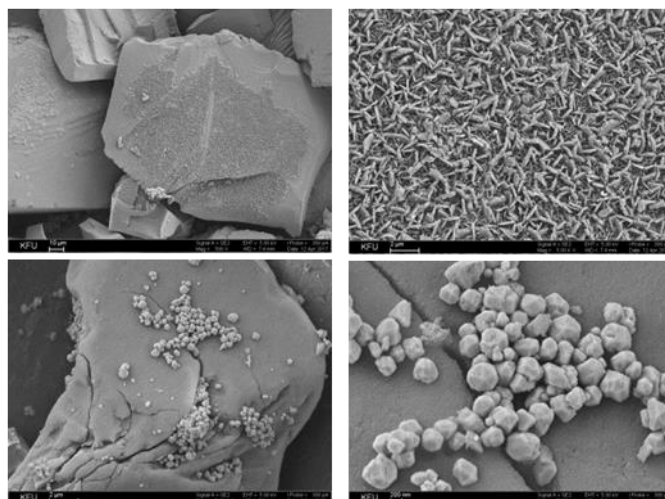


Fig. SEM image a) 10% Cu reduced by NaBH₄ (scale 10 µm); b) scale 2 µm; c) 10% Cu reduced by ascorbic acid (scale 2 µm); d) scale 200 nm.

Hereby, in this work we have obtained new "heterogenized" copper (I) -containing catalysts, based on silica support functionalized with anchoring ligands which showed a great conversion in CuAAC reactions both in flow and batch conditions. Additionally, to prevent the leakage of metal ions from catalyst in flow mode we synthesized heterogeneous copper-containing catalysts supported on silicagel by chemical reduction. The resulting copper particles were characterized by X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX). The resulting catalysts showed great activity in the CuAAC reaction.

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