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Uniformly distributed copper nanoparticles supported on mesoporous silica for greenhouse gas capturing

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We have successfully demonstrated that by changing the synthesizing conditions, MSNs, with different morphologies can be produced. Rod shape MSNs with very high surface area was obtained by carrying out the static condensation at ambient conditions. While Spherical shape MSNs was obtained when the static conditions was performed at 100°C. Loading copper metal in the rod shape MSNs using the chemical modification with PEDA produced very uniform and well distributed nanoparticles. The XRD indicated that the formation of crystalline copper nanoparticles. The rod shape MSNs showed higher CO_2 adsorption properties than the spherical counterpart thanks to high surface area and accessibility of the pores. Loading the copper nanoparticles using DAE via physical interaction between the MSNs and DAE produced very poor distribution of non-uniform aggregates of the copper nanoparticles. Therefore, the CO_2 adsorption was less than that obtained when PEDA was used. This demonstrates the pre-modification of silica surface with PEDA significantly enhanced the molecular level during the synthesis and to the absence of the heat treatment during the reduction step. In addition the advantage of this method is the nanoparticles synthesis involves the complexation of Cu^{2+} ions with the ethylenediamine functional groups which minimizes the aggregation between the produced metal nanoparticles.

Biography

Nezar H. Khdary obtained his PhD from the University of Southampton, UK 2005. He is a member of Royal Society of chemistry (MRSC,CChem), American Chemical Society, The New York Academy of Sciences, Saudi Chemical Society and Saudi Computer Society,. In 2012 he nominated an assistant professor visitor at Northwestern University. Currently Dr. Khdary is associate professor at King Abdulaziz City for Science and Technology) KACST, Saudi Arabia. His interest lies in nanoparticles synthesis, modification and applications, public health and computer graphic software. Dr. Khdary currently, continuing his research in the field of innovation of new inexpensive materials to deal with arsenic contamination in water, which becomes a global problem. In addition to that, he engages to develop new nano-materials for environmental and medical applications. Dr. Khdary obtained number of patents and several thanks certificates and honorary plaque and excellence awards.

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