

Various dendrimers functionalized mesoporous silica for CO₂ adsorption

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Dendrimers are new artificial macromolecules topologically based on the structure of a tree. They are hyperbranched, monodisperse, three-dimensional molecules, having defined molecular weight and host-guest entrapment properties. Due to their special synthesis in a stepwise manner from branched monomer units, they allow the precise control of size, shape, dimensions, density, polarity, flexibility, solubility and placement of functional groups by choosing of these building units and functional group chemistry. Various types of dendrimers are grown on mesoporous silica such as SBA-15 and KIT-6, characterized by XRD, IR, BET isotherm. The synthesized dendrimer grown SBA-15 and KT-6 are then subjected to CO₂ adsorption at low temperatures 25, 50 and 75°C under atmospheric pressure. The maximum CO₂ adsorption capacity of 5-6 wt% (50-60 mg/g of adsorbent) was observed on these dendrimer grown mesoporous silica. An interesting part of this work is that rice husk ash, agricultural waste was used as silica source for synthesis of mesoporous silica.