Synthesis of SBA-16 Cubic Mesoporous Silica Using Power Plant Bottom Ash

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An alkali fusion method was adopted to extract silicate species from coal bottom ash in a power plant and the supernatant solution was used for the synthesis of SBA-16 mesoporous silica. The minor impurities present in the bottom ash were not found to be detrimental to the successful formation of mesoporous SBA-16 silica phase. Additional silica from sodium metasilicate was introduced to improve the textural properties for SBA-16. XRD analyses confirmed well-ordered mesostructures in all of these silica materials. N2 adsorption-desorption isotherms of SBA-16 prepared using bottom ash showed a type IV isotherm with H2 hysteresis loop. TEM clearly showed the uniform pore structure of SBA-16 silica prepared using the industrial waste.