

Utilization of Mesoporous Molecular Sieves Synthesized from Natural Source Rice Husk Silica to Chlorinated Volatile Organic Compounds (CVOCs) Adsorption

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Abstract—The adsorption of trichloroethylene (TCE), tetrachloroethylene (PCE), and carbon tetrachloride was studied over our synthesized mesoporous material, MCM-41, from rice husk silica source, abbreviated as RH-MCM-41. More than 99% silica for RH-MCM-41 synthesis was extracted from rice husk under refluxing in HBr solution and then calcined at 873 K for 4 hours. RH-MCM-41 possessed surface area around 750-1,100 m²/g with a uniform pore size with an average diameter of 2.95 nm, narrow range of pore distribution and somewhat hexagonal structure, similar to properties of parent MCM-41. The adsorption of CCl₄ to RH-MCM-41 was stronger than that of TCE and PCE. The adsorption capacity of RH-MCM-41 for CVOCs (chlorinated volatile organic compounds) was higher than commercial mordenite and activated carbons.

Key words: MCM-41, Chlorinated Volatile Organic Compounds (CVOCs), Adsorption, Rice Husk Silica