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Capture of carbon dioxide by TiO_2 modified amines

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Carbon dioxide from flue gas removed using different types of solid sorbents, including porous zeolites, alumina, metal-organic frameworks, silica materials and titanium dioxide. But, most of these conventional physisorbents suffer from low CO_2 adsorption capacities at relatively low carbon dioxide partial pressure and lower selectivity toward CO_2. Said issues might be resolved by applying modifications in the surface chemistry of the porouse materials through impregnation with functional groups including alkaline carbonates and various amines such as TEPA, TETA, DEA, and TEA. Porous materials described above with high surface area and pore volume could accommodate larger amount of basic groups to capture CO_2. TiO_2 nanotubes, exhibiting hydrothermally stable tubular structure, large pore system and specific surface area enabling good accessibility for functionalization and adsorption are ideal mesoporous support for potential sorption applications. In this work, the TiO_2 produced by sulphate technology in Grupa Azoty Zakłady Chemiczne Police S.A., a chemical plant in Poland. The preparation of titanate nanotubes carried out by hydrothermal method and functionalized with different kinds of amines. The prepared adsorbents characterized by X-ray diffraction (XRD) and N2 adsorption –desorption at 77 K. The morphology of the samples was observed with a scanning electron microscope (SEM) equipped with an energy dispersive X-ray spectrometer (EDS). Textual properties defined by FTIR/DRS and Raman spectroscopy. CO_2 adsorption/desorption measurements for sample at 30 C were carried using Netzsch STA 449 C thermobalance (Netzsch Company, Germany) on the basis of the weight gain and loss during the sorption and desorption process.

Biography

Ewa Pirog has completed her Master's from West Pomeranian University of Technology, Szczecin in 2009. Currently, she is PhD student, in Institute of Chemical and Environmental Engineering.She has published one paper in reputed journal. She takes an active part in many conferences.

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