Mercury Adsorption by Sulfurized Fibrous Silicates

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Abstract: To eliminate mercury vapor from gas streams, three major methods are used: condensation, absorption, and adsorption. This work deals with adsorption, using elemental sulfur as an active phase supported on sepiolite and palygorskite fibrous clays. Sulfur loads of 5 – 30% were deposited by catalytic oxidation of hydrogen sulfide at temperatures of <200 ° C, the clays acting first as a catalyst of the reaction and then as a carder of the obtained sulfur. The ability of the sulfurized clay adsorbents to retain mercury was studied at 45 ° C and 1 mm Hg pressure. The high values found, about 4 g Hg/g S supported on clays, compared with 1.69 g Hg/g S on activated carbon under the same conditions are related to a more appropriate pore size distribution, with more of the pore widths >6 nm for the sulfurized silicates. Also, the allotropic state of the deposited sulfur, where Sπ (octo-catena) is better than Sλ (octo-cycle), may also be a contributing factor.

Key Words: Activated carbon • Adsorption • Mercury • Palygorskite • Pore size distribution • Sepiolite • Sulfurized silicates

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