The Adsorbent Size Effect on the Mercury Capture by In situ Generated Titania

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Titania particles are prepared by gas phase reaction through the quartz reactor. The characteristics of titania particles prepared by different conditions is analyzed by transmission electron microscopy (TEM) and x-ray diffraction (XRD). The geometric mean particle diameter ($d_{Sub}g$) is measured by scanning mobility particle sizer (SMPS) with nano-differential mobility analyzer (nano-DMA). TEM image analysis is to evaluate the properties of agglomerates, such as fractal dimension ($D_{Sub}f$), primary particle size, and the radius of gyration ($R_{Sub}g$). Experiments were performed to investigate the mercury removal efficiencies for primary furnace temperature (500-1000 ^{Sup}oC). Titania particles in the presence of UV irradiation chemisorbed mercury on titania surface area. With increasing in primary furnace temperature, the mercury capture efficiencies are increased from 7.6 to 77.6%. This is probably because with increasing in primary furnace temperature, the structure of titania particles is more opened, and the effective surface area is increased.