

### Silanol-rich Ordered Mesoporous Silica Modified Thiol Group for Enhanced Recovery Performance of Au(III) in Acidic Leachate Solution

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We present a new approach to enhance the recovery performance of Au(III) using thiol-functionalized adsorbents in acidic leachate solution. Ordered mesoporous silicas (OMS) with abundant surface silanol were obtained from mine tailings by solvent extraction. Overall, the surface silanol groups had the greatest effect on sulfur density and content under the conditions for functionalization with 3-mercaptopropyl-trimethoxysilane. Furthermore, Si-OH-rich OMS functionalized with thiol exhibited greater sulfur content and higher Au(III) adsorption capacity in a single-component solution. These are attributed to the high sulfur content and its increased uniformity in Si-OH-rich OMS adsorbents, which increased the inward diffusion of Au(III) and effectively improved its accessibility to the activated sites.

This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2017R1C1B2011235) and the Korea Institute of Geoscience and Mineral Resources (KIGAM, 19-6825).