

TITLE	PREPARATION AND SURFACE MODIFICATION OF SILICA AEROGEL/POLYURETHANE SPONGE FOR OIL ADSORPTION
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ABSTRACT	<p>For preparation and modification of oil adsorption, superhydrophobic polyurethane sponge (PUS) for application in oil cleanup model was studied. The dipping method was used to attach the hydrophobic silica aerogel (SA) into the porous 3D structure of PUS to make hydrophobic PUS. UV treatment and ultrasonication SA process were used to enhance the adhesion of SA to PUS. Concentration of SA, types of SA (in-lab SA; and REM TECH SA or R-SA), UV irradiation time, and time of ultrasonication were varied to attain optimal attachment of SA on PUS. Fourier- Transform Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM), and contact angle measurements (CA) were used to determine the adhesion of SA on PUS. The results showed that the interaction between in-lab SA (or R-SA) and PUS increased after UV treatment and ultrasonication process. The spectra of samples after UV treatment showed the decreasing of N-H peak (specific to PUS) and increasing of Si-N & Si-C peaks (specific to new interaction between SA and PUS). However, spectra of samples with ultrasonication process showed similar peaks to SA spectra. The surface of PUS was hydrophilic (CA = 88 degrees); but after treatment with in-lab SA PUS and R- SA, the surface became superhydrophobic (CA = 156 and 160 degrees). Oil adsorption experiment was investigated, and the results showed that original PUS had low rate of oil adsorption and low oil adsorption capacity. After modification of the SA/PUS samples, rate of oil adsorption and oil adsorption capacity were increased. The adsorption rate and adsorption capacity of R-SA/PUS were higher than that of in-lab SA/PUS. UV treatment samples and ultrasoincation samples had higher adsorption rate and adsorption capacity than stir samples. Finally, the SA/PUS in this research showed fast (within 30-120 seconds), high adsorption capacity (69-75 g/g) with simple method of preparation.</p>