

A Novel Material for Oil-water Separation

Oil products such as petroleum have greatly benefited the human society. However, they may lead to safety and health problems if not handled properly. For example, the oil spillage in the Gulf of Mexico caused serious ocean contamination and ecosystem damage in 2010. There is an urgent need, therefore, to develop materials that can effectively adsorb and transfer spilled oil and chemicals from water.

A team led by Prof. MA Pengcheng from the Xinjiang Technical Institute of Physics and Chemistry, Chinese Academy of Sciences has developed a novel method for the preparation of silicone sponges via a facile sol-gel process. Using commercial silane molecules as precursors, they prepared ternary silicone sponges with controlled structure and porosity by controlling the degree of hydrolyzation and experimental conditions (pH, temperature).

They examined the morphological, mechanical and thermal properties of the new ternary silicone sponge. Results showed that the sponge displayed a stable water

contact angle above 150° , high efficiency for separating various organic liquids from water with adsorption capacity ranging from 6 to 14 times of its own weight, and an excellent recyclability under cyclic operations. More importantly, they found that when one end of the strip sponge was put into the liquid, a spontaneous diffusion process occurred in the sample due to the capillary effect, leading to different diffusion speeds and adsorption behaviors. Based on this observation, the sponge could be used for the separation of miscible organic liquids.

The results of the study were published in *Polymer Chemistry*. Part of this research was presented as an invited talk at the 7th International Symposium on Engineering Plastics (EP-2015).

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