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Author: Yue Hong Wenlong Xu Yuanyuan Hu Guihua Li  
Mengjun Chen Jingcheng Hao Shuli Dong



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## Multi-responsive emulsion of stearic acid soap aqueous solution

Yue Hong, Wenlong Xu, Yuanyuan Hu, Guihua Li, Mengjun Chen,  
Jingcheng Hao, and Shuli Dong\*

*Key Laboratory of Colloid and Interface Chemistry & Key Laboratory of Special Aggregated Materials (Shandong University), Ministry of Education, Jinan 250100, P. R. China*

\* Corresponding author. Tel.: +86-531-88363768, Fax: +86-531-88564750

E-mail: shuli@sdu.edu.cn

### Research Highlights:

1. The phase behavior of stearic acid and alkali in water was observed.
2. Multi-responses of the emulsion stabilized by bilayers were achieved.
3. The ability of stabilizing the emulsion by the bilayers and micelles was compared.

### ABSTRACT:

Stearic acid (SA) mixed with alkali in water can form different fascinating aggregates in solution. The phase behavior of SA and alkali in water was observed in this work, and the apparent viscosity was measured by rheological measurements. Fatty acid self-assembled into bilayers at  $\text{pH} \approx \text{pK}_a$  and the structure was determined by cryogenic transmission microscopy (Cryo-TEM) observations. The ability of stabilizing the emulsion by the bilayers and micelles was compared. The

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