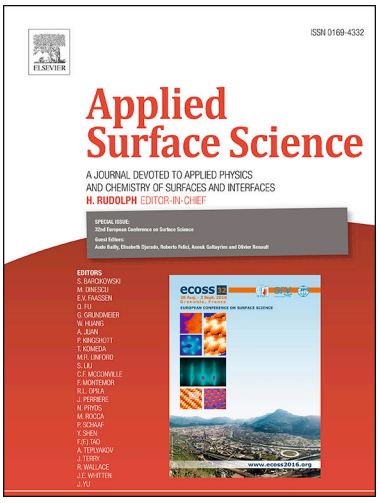
Accepted Manuscript



Full Length Article

A Green and Facile Approach to the Efficient Surface Modification of Alumina Nanoparticles with Fatty Acids

Zhao Liu, Lehan Yao, Xun Pan, Qiong Liu, He Huang

PII: S0169-4332(18)30989-9
DOI: https://doi.org/10.1016/j.apsusc.2018.04.035
Reference: APSUSC 39034

To appear in: *Applied Surface Science*

Received Date: 9 February 2018
Revised Date: 24 March 2018
Accepted Date: 4 April 2018

Please cite this article as: Z. Liu, L. Yao, X. Pan, Q. Liu, H. Huang, A Green and Facile Approach to the Efficient Surface Modification of Alumina Nanoparticles with Fatty Acids, *Applied Surface Science* (2018), doi: https://doi.org/10.1016/j.apsusc.2018.04.035

A Green and Facile Approach to the Efficient Surface Modification of Alumina Nanoparticles with Fatty Acids

Zhao Liu,[1] Lehan Yao, [1] Xun Pan, [1] Qiong Liu, [2] He Huang[1,2]

[1]State and Local Joint Engineering Laboratory for Novel Functional Polymeric Materials, Jiangsu Key Laboratory for the Design and Application of Advanced Functional Polymer, College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, China

[2]Zhangjiagang Unikever New Materials Technology Co. Ltd., Zhangjiagang 215600, China

E-mail: hehuang@suda.edu.cn

ABSTRACT

A general, green and facile approach to the efficient surface modification of alumina and other metal oxide nanoparticles with fatty acids have been proposed. In this process, only water was used as the dispersing medium, the modified metal oxide nanoparticles were automatically separated from water, and water can be recycled. The modification efficiency, using oleic acid as an example, of this water alone method was 36% higher than that of the water-ethanol method, which is a result of higher opportunity of interfacial reaction between oleic acid and Al_2O_3 molecules on the surface of alumina nanoparticles dispersed in water only. The modification efficiency increases with increasing chain length of the fatty acids. After modification with fatty acids, the crystalline structure of alumina remains unchanged, the