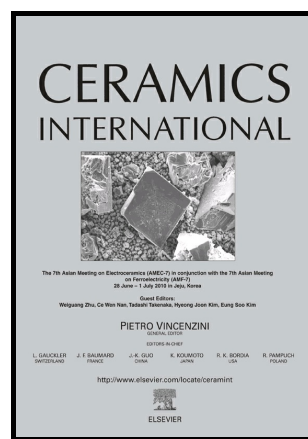


Preparation and Tribological properties of novel
Boehmite/Graphene Oxide nano-hybrid

Lei Zhang, Yi He, Shuangwei Feng, Ling Zhang,
Lei Zhang, Zhiling Jiao, Yingqing Zhan, Yajie
Wang



www.elsevier.com/locate/ceri

PII: S0272-8842(16)00028-6
DOI: <http://dx.doi.org/10.1016/j.ceramint.2015.12.178>
Reference: CERII1976

To appear in: *Ceramics International*

Received date: 15 December 2015
Revised date: 29 December 2015
Accepted date: 31 December 2015

Cite this article as: Lei Zhang, Yi He, Shuangwei Feng, Ling Zhang, Lei Zhang Zhiling Jiao, Yingqing Zhan and Yajie Wang, Preparation and Tribological properties of novel Boehmite/Graphene Oxide nano-hybrid, *Ceramic International*, <http://dx.doi.org/10.1016/j.ceramint.2015.12.178>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Preparation and Tribological properties of novel Boehmite/Graphene Oxide nano-hybrid

Lei Zhang^{a, c}, Yi He^{*a, b}, Shuangwei Feng^c, Ling Zhang^c, Lei Zhang^{a, b}, Zhiling Jiao^c, Yingqing Zhan^{**a}, Yajie Wang^a

^a School of Chemistry and Chemical Engineering, Southwest Petroleum University, 8 Xindu Avenue,
Chengdu, Sichuan 610500, China

^b State Key Lab of Oil and Gas Reservoir Geology and Exploitation, Southwest Petroleum University,
8 Xindu Avenue, Chengdu, Sichuan 610500, China

^c Chengdu Lubricant Blending Plant, PetroChina, 188 Xingchuan Avenue, Chengdu, Sichuan 610083,
China.

Abstract

Novel boehmite/graphene oxide nano-hybrid (GO-GPTS-AlOOH) was prepared through a simple covalent bond method, which was subsequently explored as lubricant additive. For this purpose, the 3-glycidoxypropyl-trimethoxysilane (GPTS) was first chemically grafted on nano-boehmite (AlOOH) to fabricate the modified boehmite (GPTS-AlOOH). Then the GPTS-AlOOH was anchored on graphene oxide (GO) nanosheets to prepare GO-GPTS-AlOOH nano-hybrid through a coupled reaction. The structure, composition and morphology of GO-GPTS-AlOOH was characterized by FT-IR, XRD, TG/DTG, SEM and TEM, revealing that nano-boehmite was uniformly coated on GO surface. More importantly, tribological properties of GO-GPTS-AlOOH as lubricating oil additive were investigated using a ball-on-disc testing machine and a four-ball machine. It was found that the friction reduction and anti-wear ability of lubricant oil containing GO-GPTS-AlOOH hybrid was highly improved compared to bare base oil (VHVI8). Specifically, friction coefficient (COF), wear scar diameter (WSD) and wear rate were reduced by 14%, 28% and 73%, respectively. The enhancement can be attributed to the synergistic effect of the nanobearing mechanism and ultimate strengthen of graphene sheets between the frictional interfaces.

Key words: graphene oxide, boehmite, 3-glycidoxypropyltrimethoxysilane, lubricant, friction reduction, anti-wear

1. Introduction

Download English Version:

<https://daneshyari.com/en/article/10623992>

Download Persian Version:

<https://daneshyari.com/article/10623992>

[Daneshyari.com](https://daneshyari.com)