

Accepted Manuscript

Title: Oxime-modified aluminium(III) alkoxides: Potential precursors for alumina nano-powders and optically transparent alumina film

Authors: Ajay Saini, Suraj Karan Jat, Dalip Singh Shekhawat, Ajay Kumar, Veena Dhayal, Dinesh Chandra Agarwal



PII: S0025-5408(16)32444-8
DOI: <http://dx.doi.org/doi:10.1016/j.materresbull.2017.04.011>
Reference: MRB 9271

To appear in: *MRB*

Received date: 10-12-2016
Revised date: 6-4-2017
Accepted date: 6-4-2017

Please cite this article as: Ajay Saini, Suraj Karan Jat, Dalip Singh Shekhawat, Ajay Kumar, Veena Dhayal, Dinesh Chandra Agarwal, Oxime-modified aluminium(III) alkoxides: Potential precursors for alumina nano-powders and optically transparent alumina film, Materials Research Bulletin <http://dx.doi.org/10.1016/j.materresbull.2017.04.011>

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 proof before it is published in its final 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.

Oxime-modified aluminium(III) alkoxides : Potential precursors for alumina nano-powders and optically transparent alumina film

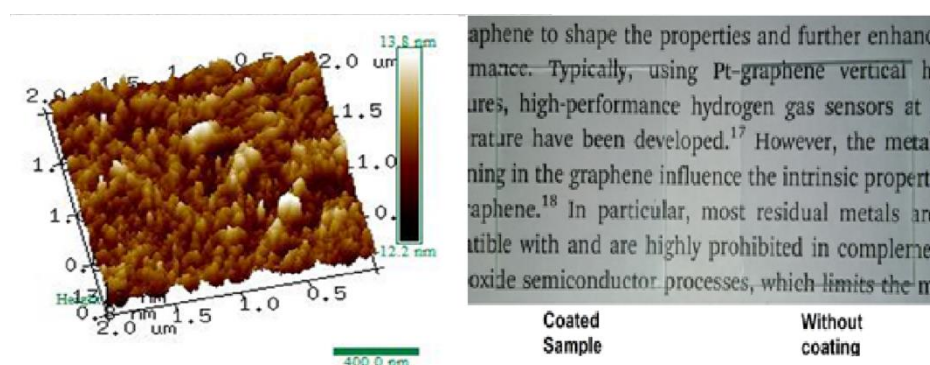
Ajay Saini^a, Suraj Karan Jat^a, Dalip Singh Shekhawat^b, Ajay Kumar^b, Veena Dhayal^{a*},
Dinesh Chandra Agarwal^b

^a Department of Chemistry, Manipal University Jaipur, Jaipur, India, 303007

^b School of Automobile, Mechanical & Mechatronics, Manipal University Jaipur, Jaipur, India, 303007

*E-mail: dhayal21v@gmail.com, Tel. No. +91-141-3999100 Ext. 320

Graphical abstract



Highlights

Alumina precursors of the type, $[\text{Al}(\text{O}^i\text{Pr})_{3-n}\{\text{ONC}(\text{CH}_3)_2\}_n]$, where $n = 1, 2$ or 3 were synthesized using aluminium(III) *iso*-propoxide and acetoxime. Soft transformation of these complexes to alumina nano-powders was carried out by the sol-gel process. Optically transparent crack free alumina film was deposited on the glass substrate using alumina sol, prepared by the complex, $[\text{Al}(\text{O}^i\text{Pr})\{\text{ONC}(\text{CH}_3)_2\}_2]$ through dip coating method. The alumina film is found to be ~95% optically transparent in the visible region.

Abstract

Reactions of aluminium(III) *iso*-propoxide (**A**) with acetoxime in anhydrous benzene yielded complexes of the type $[\text{Al}(\text{O}^i\text{Pr})_{3-n}\{\text{ONC}(\text{CH}_3)_2\}_n]$, where $n = 1$ (**1**), 2 (**2**) & 3 (**3**). These complexes were characterized by elemental analysis, FTIR and NMR (^1H , ^{13}C , ^{27}Al) spectral studies. Spectral studies of (**1-3**) suggest the presence of bi-dentate mode of the oximate moieties in the solution state. Soft transformations of aluminium(III) *iso*-propoxide (**A**) and their oxime derivatives (**1-3**) to pure alumina (**a-d**) were carried out by the sol-gel technique. The powder XRD patterns of all the formed

Download English Version:

<https://daneshyari.com/en/article/5441908>

Download Persian Version:

<https://daneshyari.com/article/5441908>

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