

## Journal Menu

[Abstracting and Indexing](#)  
[Aims and Scope](#)  
[Article Processing Charges](#)  
[Articles in Press](#)  
[Author Guidelines](#)  
[Bibliographic Information](#)  
[Contact Information](#)  
[Conference Sponsorships](#)  
[Editorial Board](#)  
[Editorial Workflow](#)  
[Reviewers Acknowledgment](#)  
[Subscription Information](#)

[Open Special Issues](#)  
[Special Issue Guidelines](#)

[Call for Proposals for  
Special Issues](#)

Advances in Materials Science and Engineering  
Volume 2008 (2008), Article ID 345895, 12 pages  
doi:10.1155/2008/345895

Research Article

## Characterization and Catalytic Performance of Niobic Acid Dispersed over Titanium Silicalite

Didik Prasetyoko,<sup>1</sup> Zainab Ramli,<sup>2</sup> Salasiah Endud,<sup>2</sup> and Hadi Nur<sup>3</sup>

<sup>1</sup>Department of Chemistry, Faculty of Mathematic and Sciences, Institut Teknologi Sepuluh Nopember, Surabaya 60111, Indonesia

<sup>2</sup>Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia

<sup>3</sup>Ibnu Sina Institute for Fundamental Science Studies, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia

Received 14 May 2008; Accepted 7 August 2008

Academic Editor: Sridhar Komarneni

### Abstract

Niobic acid,  $Nb_2O_5 \cdot nH_2O$ , has been supported on the titanium silicalite by impregnation method. The obtained materials were characterized by X-ray diffraction, infrared, and ultra-violet—visible diffuse reflectance spectroscopy, temperature programmed reduction, pyridine adsorption, and field emission scanning electron microscopy techniques. It was demonstrated that the tetrahedral titanium species still retained after impregnation of niobic acid. The results revealed that niobium species interacted with hydroxyl groups on the surface of TS-1. The niobium species in the catalysts are predominantly polymerized niobium oxides species or bulk niobium oxide with the octahedral structure. All catalysts showed both Brønsted and Lewis acid sites. The catalysts have been tested for epoxidation of 1-octene with aqueous hydrogen peroxide. It was found that the presence of niobic acid in the catalysts enhanced the rate of the formation of epoxide at the initial reaction time. Diol as a side product was also observed due to the acidic properties of the catalysts.

[Abstract](#)

[Full-Text PDF](#)

[Full-Text HTML](#)

[Linked References](#)

[How to Cite this Article](#)