Title: Study on the use of MgAl hydrotalcites as solid heterogeneous catalysts for biodiesel production

Author(s): **Gomes, João F. P.**[1,2]; **Puna, Jaime F. B.**[1]; **Gonçalves, Lissa M.**[1]; Bordado, João C. M.[2]

Source: Energy

Volume: 36 **Issue:** 12 **Pages:** 6770-6778 **DOI:** 10.1016/j.energy.2011.10.024 **Published:** Dec 2011

Document Type: Article

Language: English

Abstract: This paper, reports experimental work on the use of new heterogeneous solid basic catalysts for biodiesel production: double oxides of Mg and Al, produced by calcination, at high temperature, of MgAl lamellar structures, the hydrotalcites (HT). The most suitable catalyst system studied are hydrotalcite Mg:Al 2:1 calcinated at 507 degrees C and 700 degrees C, leading to higher values of FAME also in the second reaction stage. One of the prepared catalysts resulted in 97.1% Fatty acids methyl esters (FAME) in the 1st reaction step, 92.2% FAME in the 2nd reaction step and 34% FAME in the 3rd reaction step. The biodiesel obtained in the transesterification reaction showed composition and quality parameters within the limits specified by the European Standard EN 14214. 2.5% wt catalyst/oil and a molar ratio methanol:oil of 9:1 or 12:1 at 60 -65 degrees C and 4 h of reaction time are the best operating conditions achieved in this study. This study showed the potential of Mg/Al hydrotalcites as heterogeneous catalysts for biodiesel production.

Author Keywords: Biodiesel; Hydrotalcites; Heterogeneous Catalysts

KeyWords Plus: Near-Infrared Spectroscopy; Layered Double Hydroxides; Transesterification; Triglycerides; Al; Quality; Oxides; Fuel; Oil

Reprint Address: Gomes, JFP (reprint author), ISEL, Dept Chem Engn, Rua Conselheiro Emídio Navarro 1, P-1959007 Lisbon, Portugal.

Addresses:

1. ISEL, Dept Chem Engn, P-1959007 Lisbon, Portugal
2. IST Inst Super Tecn UTL, Inst Biotechnol & Bioengn, P-1049001 Lisbon, Portugal

E-mail Address: jgomes.email@gmail.com

Publisher: Pergamon-Elsevier Science LTD
Publisher Address: The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England

ISSN: 0360-5442

Citation: GOMES, João F. P.; PUNA, Jaime F. B.; GONÇALVES, Lissa M.; BORDADO, João C. M. - Study on the use of MgAl hydrotalcites as solid heterogeneous catalysts for biodiesel production. Energy. ISSN 0360-5442. Vol. 36, n.º 12 (2011) p. 6770-6778.