

**SYNTHESIS, CHARACTERIZATION AND  
APPLICATION OF  $MgF_{2-x}(OH)_x$  ON  
TRIMETHYLHYDROQUINONE (TMHQ) AND  
ISOPHYTOL REACTION**

**Name** : Husnul Khotimah  
**NRP** : 1412 100 053  
**Department** : Chemistry ITS  
**Supervisor** : Prof. Dr.rer.nat. Irmina Kris Murwani

**ABSTRACT**

Catalyst  $MgF_{2-x}(OH)_x$  have been synthesized by sol-gel method. The catalysts were characterized by FTIR to confirm the formed bond, X-ray diffraction (XRD) to determine the crystal structure, pyridine-FTIR to determine the acidity both Lewis acidity and Brønsted acidity and nitrogen adsorption to determine the specific surface area ( $S_{BET}$ ) of the catalyst. The catalytic activity of catalyst were tested by trimethylhydroquinone (TMHQ) and isophytol reaction. Result of FTIR characterization showed that catalysts have been successfully synthesized. Result of XRD showed catalyst  $MgF_{2-x}(OH)_x$  have amorphous structure. All catalyst showed Lewis acidity and Brønsted acidity. The best TMHQ conversion up to 65,52% was obtained by  $MgF_{1,5}(OH)_{0,5}$  catalyst. The best selectivity of benzofuran up to 54,21% was obtained by MgFOH catalyst. Catalyst selectivity for benzofuran is influenced by surface area, Lewis acidity and Brønsted acidity.

**Keyword:** Magnesium hydroxide fluoride,  $MgF_{2-x}(OH)_x$  catalyst, TMHQ and isophytol reaction

# SINTESIS, KARAKTERISASI DAN APLIKASI KATALIS $MgF_{2-x}(OH)_x$ PADA REAKSI ANTARA TRIMETILHIDROKUINON (TMHQ) DAN ISOFITOL

**Nama** : Husnul Khotimah  
**NRP** : 1412 100 053  
**Jurusan** : Kimia ITS  
**Pembimbing** : Prof. Dr. rer. nat. Irmina Kris Murwani

## ABSTRAK

Pada penelitian ini telah dilakukan sintesis katalis  $MgF_{2-x}(OH)_x$ . Ikatan kimia dalam sampel katalis dikarakterisasi dengan Spektrofotometer FTIR, struktur kristal dikarakterisasi dengan Difraksi Sinar-X (XRD), keasaman katalis ditentukan dengan piridin-FTIR serta luas permukaan spesifik ( $S_{BET}$ ) diukur dengan adsorpsi gas nitrogen. Reaksi katalisis dilakukan pada reaksi antara trimetilhidrokuinon (TMHQ) dan isofitol. Hasil FTIR menunjukkan katalis telah berhasil disintesis. Hasil XRD menunjukkan katalis  $MgF_{2-x}(OH)_x$  memiliki struktur amorf. Keasaman katalis menunjukkan adanya sisi asam Lewis dan sisi asam Brønsted. Konversi TMHQ tertinggi sebesar 65,52% dicapai oleh katalis  $MgF_{1,5}(OH)_{0,5}$ . Selektivitas tertinggi terhadap benzofuran dicapai oleh katalis MgFOH yaitu sebesar 54,21%. Selektivitas benzofuran hasil katalisis dipengaruhi oleh luas permukaan, keasaman Lewis dan keasaman Brønsted.

Kata kunci: Magnesium fluorida terhidroksilasi, katalis  $MgF_{2-x}(OH)_x$ , reaksi antara TMHQ dan isofitol