

## Microstructure Study On Fe/Cr Based Alloys Added With Yttrium Oxide (Y<sub>2</sub>O<sub>3</sub>) Prepared Via Ultrasonic Technique For Solid Oxide Fuel Cell (Sofc) Application.

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**Abstract**— Solid oxide fuel cells (SOFC) are the current research having several potential to obtain high efficiency, high energy–density power generation which operated at relatively higher temperature. Yttrium oxide (Y<sub>2</sub>O<sub>3</sub>) contributions at high temperature are accelerating to the development oxide layer of FeCr alloy. The aim of this research is to investigate the microstructure of Fe/Cr added with Y<sub>2</sub>O<sub>3</sub> acting as a reactive element. The purpose is to improve macrostructure of Fe/Cr powders which can be applied at steel industry. In this study the mixing process of Fe/Cr and Y<sub>2</sub>O<sub>3</sub> powder was conducted via ultrasonic treatment at a frequency of 22 kHz, and at two different holding time of 2.5 h and 3.5 h. The particle size of chromium (Cr) can be reduced by ultrasonic treatment at from 60µm to 30µm through threshing the cluster of Cr particle. It shows that the ultrasonic vibration effectively removes oxides and other contaminates on a surface coating. Therefore, homogeneity of the parent material, segregation, and uniform distribution of second phase were increased..

**Keywords:** *Solid oxide fuel cells; Iron Chromium; ultrasonic treatment*