Nitiwadee Akasil 2009: Synthesis and Fabrication of Carbon Nanotubes as Carbon Monoxide Sensor. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Metta Chareonpanich, D.Eng. 61 pages.

In this research, the CO sensor was fabricated using multiwall carbon nanotubes/anodic aluminum oxide (MWNTs/AAO) composites as the key material. Carbon nanotubes were synthesized via chemical vapor deposition (CVD) technique using an anodic aluminum oxide film. Acetylene gas was used as the carbon source. The layers of obtained MWNTs/AAO were 110 with the growth temperature of 750^{o}C. After that, the obtained multi-walled carbon nanotubes were modified by loading reactive metals including platinum (Pt), ruthenium (Ru) and Nickel (Ni) into their framework structures for the CO detection. Platinum gave the highest amount of metal particles. The textural properties of the resulting Ni-MWNTs/AAO composites were characterized by Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM). The effect of CO on an electrical property of metal-loaded carbon nanotubes-based gas sensor was investigated using electrical resistance measurement technique. The Pt-CNTs/AAO revealed the highest performance for CO detection as a significant change of electrical resistance was observed. With Ni-CNTs/AAO sensor, the result in the electrical resistance change was quite similar to that of Pt-CNTs/AAO whereas the amount of nickel loaded was approximately 1,000 times less than that of platinum. Therefore, the effect of concentration of nickel loaded of 1%, 4%, 10%, and 15% were investigated. The concentration of nickel loaded of 15% provided the highest electrical resistance change during CO adsorption.

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