Phichamon Viboon 2008: Metal-loaded Multi-walled Carbon Nanotubes Based Gas Sensor for LPG Detection. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Metta Chareonpanich, D.Eng. 65 pages.

In this study, multi-walled carbon nanotubes were synthesized via the chemical vapor deposition (CVD) technique using anodic aluminum oxide (AAO) film as a template and 10% acetylene gas in nitrogen gas as a carbon source for 150 minutes. The carbon nanotubes on anodic aluminium oxides composites (CNTs/AAO) were synthesized by using the growth temperatures of 750^{o}C and 1,000^{o}C. The layers of obtained CNTs/AAO were 64 and 117 with the growth temperature of 750^{o}C and 1000^{o}C, respectively. 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 LPG detection. The result revealed that the number of layer of CNTs/AAO composites influenced the amount of metal loaded inside the structure. Ruthenium gave the highest amount of metal particle. The morphology and structure of the obtained multi-walled carbon nanotubes were investigated using scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The surface area and pore volume were characterized by N_2-Adsorption (Autosorb-I) technique. The effects of LPG on an electrical property of metal-loaded carbon nanotubes-based gas sensor were investigated using electrical resistance measurement technique. The Ni-CNTs/AAO-1000 product revealed the highest performance for LPG detection as it had a large significant change of resistance even small amount of nickel was loaded inside the structure of CNTs/AAO.

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