

Pimpaka Suwanmalee 2014: Methyldiethanolamine (MDEA) Degradation by Electrooxidation with Titanium (Ti) Anode. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Patcharaporn Suwanvitaya, M.Appl.Sc. 86 pages.

Methyldiethanolamine (MDEA) is tertiary amine, not readily degraded by biological process and stable in the environment. The objective of this study was to determine the efficiency of electrooxidation process of MDEA and investigate the products of process. Electrooxidation process was performed on synthetic wastewater, containing 500 mg MDEA/l, in a 4L batch reactor, using titanium coated metal as anode and stainless steel as cathode placed at 1 cm electrode distance. Electrolytic cell, with direct current power supply, was single cell monopolar type. The experiment was divided into 2 parts. In the first part, the variables were voltages (10, 15, 20V) and pH (4, 7, 9). In the second part, H<sub>2</sub>O<sub>2</sub> was added at 100, 300, 500 mM under 20V at pH 4, 7, 9. The results from the first part showed that MDEA removal was influenced by pH and voltage. The highest MDEA removal of 31.15% was achieved at pH4, 20V. However, 7.69% COD and 16.22% organic nitrogen could be removed. This showed that MDEA was not completely oxidized. Monoethanolamine, diethanolamine, glycolic acid, glycine, oxalic acid, formic acid and acetic acid were electrooxidation products found. The addition of H<sub>2</sub>O<sub>2</sub> (in the second part) enhanced organic nitrogen removal, The highest removal of organic nitrogen (70.29%) was achieved at pH 9 with the highest accumulated amount of NO<sub>3</sub><sup>-</sup> (108.12 mg/l). Oxidation products from this condition were glycine, oxalic acid and acetic acid.

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