# CAPABILITY STUDY OF ELECTRO-PEROXONE PROCESS IN A CYLINDRICAL REACTOR IN DEGRADING ACID ORANGE 7

***Mohamad Ghalebizade***
***Bita Ayati***
***Hossein Ganjidoust***
*Tarbiat Modares University, Tehran, Iran*

**Abstract**
Electro-peroxone is a novel advanced oxidation process that surpasses ozonation or peroxone because of its advantages. In this technology, combining ozone and hydrogen peroxide produced electrochemically leads to the generation of hydroxyl radicals, which are the strongest oxidizing agents. In this study, a cylindrical reactor with a continuous circular flow using novel arrangements of electrodes was used to examine the effects of variant parameters on dye removal efficiency. Acid Orange 7 ($C_{16}H_{11}N_2NaO_4S$) served as an indicator pollutant. Based on overall energy consumption and energy consumption per dye removed weight, electro-peroxone not only has a proper efficiency at high dye concentrations, it also has the least energy consumption per dye removed weight; 53 KWh/kg is achieved for 500 mg/L initial dye concentration at 99% removal efficiency after 40 minutes. The OFAT method was used to optimize parameters including dye concentration, pH, ozone injection rate, current intensity, flow rate, and electrolyte concentration; finally, COD and TOC removal were measured. The results show that at the optimum condition of [Dye]=500 mg/L, pH=7.7, applied current=0.5 A, $O_3$=1 L/min, [$Na_2SO_4$]=0.1M, and Q=8.5 L/hr, dye is removed completely after 90 minutes and COD and TOC removal is 99% and 90%, respectively.

**Keywords:** Electro-peroxone; energy consumption; advanced oxidation process; Acid Orange 7; hydrogen peroxide.

ISBN: 978-91-88898-28-9