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**PROTECTION OF ALUMINUM ALLOY FROM CORROSION IN NaCl SOLUTION USING Nd:YAG LASER TECHNIQUE**, A Thesis Submitted to the Department of Chemical Engineering of the University of Technology in a Partial Fulfillment of the Requirements for the Degree of Master of Science in Chemical Engineering-2013

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## *Abstract*

This work deals with the effect of some variables on corrosion of (2024) aluminum alloy protected by laser technology. The electrochemical behavior of Al alloy in (NaCl) solution of concentrations and temperatures is studied.

Disc samples of (2024) aluminum alloy of 2 mm thickness and 25 mm diameter, have been prepared Polarization experiments. Polarization tests were carried out under static condition at temperature of 298, 313 & 328 K in NaCl solution of concentration of (1.5, 2.5 & 3.5) % were carried out before and after laser surface treatment by a specific laser pulse.

Before laser surface treatment the results show that the corrosion current densities increase with increasing temperature. Moreover the corrosion potential shifts to more negative values.

However increasing the NaCl concentration leads to an increase in corrosion current density and the corrosion potential shifts to more negative value. The breaking potentials range from about -400 to -560 mv.

After laser surface treatment, the corrosion current density was almost constant through the work while the corrosion potential was constant at a given concentration and temperature.

No pitting corrosion was observed on the sample after laser surface treatment and breaking potential was not reached till +400 mv.

**Key word:** laser surface treatment, ND:YAG laser ,corrosion of aluminum,