REMOVAL AND RECOVERY OF SOME HEAVY METALS FROM DILUTED SOLUTIONS WHICH HAVE THE SAME RECIPES OF SIMULATED INDUSTRIALWASTEWATERS BY CEMENTATION

BY

Heba Ali Mohamed Abd El Gawad

A Thesis Submitted to the

Faculty of Engineering at Cairo University in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In

CHEMICAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY

GIZA, EGYPT

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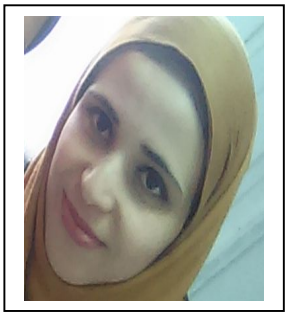

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Title of Thesis:

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Key Words: Heavy metals; Cementation kinetics; Silver removal/recovery; Copper and Lead removal/recovery; Simultaneous removal.

Summary:

The process of copper, lead and silver ions cementation from mono-metallic, bi-metallic and tri-metallic solutions utilizing simple-agitated reactor is reported in this thesis. The results of investigating the diverse parameters affecting the cementation process, such as initial ions concentration, initial pH, rotational speed, reaction temperature and mass of sacrificial metal are demonstrated and discussed. In this dissertation, as well, a special concern was directed to the kinetics of cementation reaction with a view to demonstrate the effect of each parameter on the apparent rate constant of the cementation reaction. Ultimately, a correlation for predicting the rate constant was obtained by utilizing statistical regression technique.

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