

ACKNOWLEDGEMENT

The author is also indebted to Professor Dr. Ahmed Khalil Ghonaim, faculty of science, Zagazig University for his kind interest, valuable assistance and sincere help.

The author of this thesis wishes to express his gratitude to Professor Dr. Abd El Fattah Abdallah, faculty of science, Zagazig University, Benha branch for his kind interest and valuable assistance throughout the progress of the work.

The author is indebted to Professor Dr. Khairy Mahmoud Elbadry, Glass Research Department, National Research Center, Cairo, for suggesting the problem and valuable supervision.

My deep appreciation to my family, mother and my wife for their help during the progress of this work.

My deep appreciation for Eng. Samia Magdi Uonis, technical manager of Egyptian Glass Company for opportunity she gave me to carryout the present thesis.

The author would like to thank Chem. Ayman Mohammed Abd Elrasool, manager of Quality Control Department, Chem. Abd Elrahman Mohammed Hassan manager of physico-chemical laboratory for their help during the progress of this work.

My deep thanks to my colleagues Chem. Ahmed Atiah Sakr, Chem. Mohammed Ali Marzouk, Chem. Ahmed Samir Ameen, Chem. Moataz Mohammed ElGohary and Chem. Mohammed Abdel Aziz Ibraheem for their great help during the progress of this work.