

# **UTILIZATION OF ALUMINUM SULFATE MANUFACTURING WASTE IN THE PRODUCTION OF ZEOLITES**

**By**

**EL- Sayed Abd EL- Moneim Ahmed**

B.Sc. in Biochemistry, Faculty of science, Ain Shams University, 2000

Diploma in Biochemistry and Physiology, Faculty of science,

Suez canal University, 2006

**A thesis submitted in partial fulfillment**

**of**

**The requirements for the Master degree**

**In**

**Environmental Sciences**

**Department of Basic Sciences**

**Institute of environmental studies and research**

**Ain Shams University**

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**Under the supervision of:**

**1. Prof. Dr. Taha Abdel Azim Mohammed Abdel Razeq**

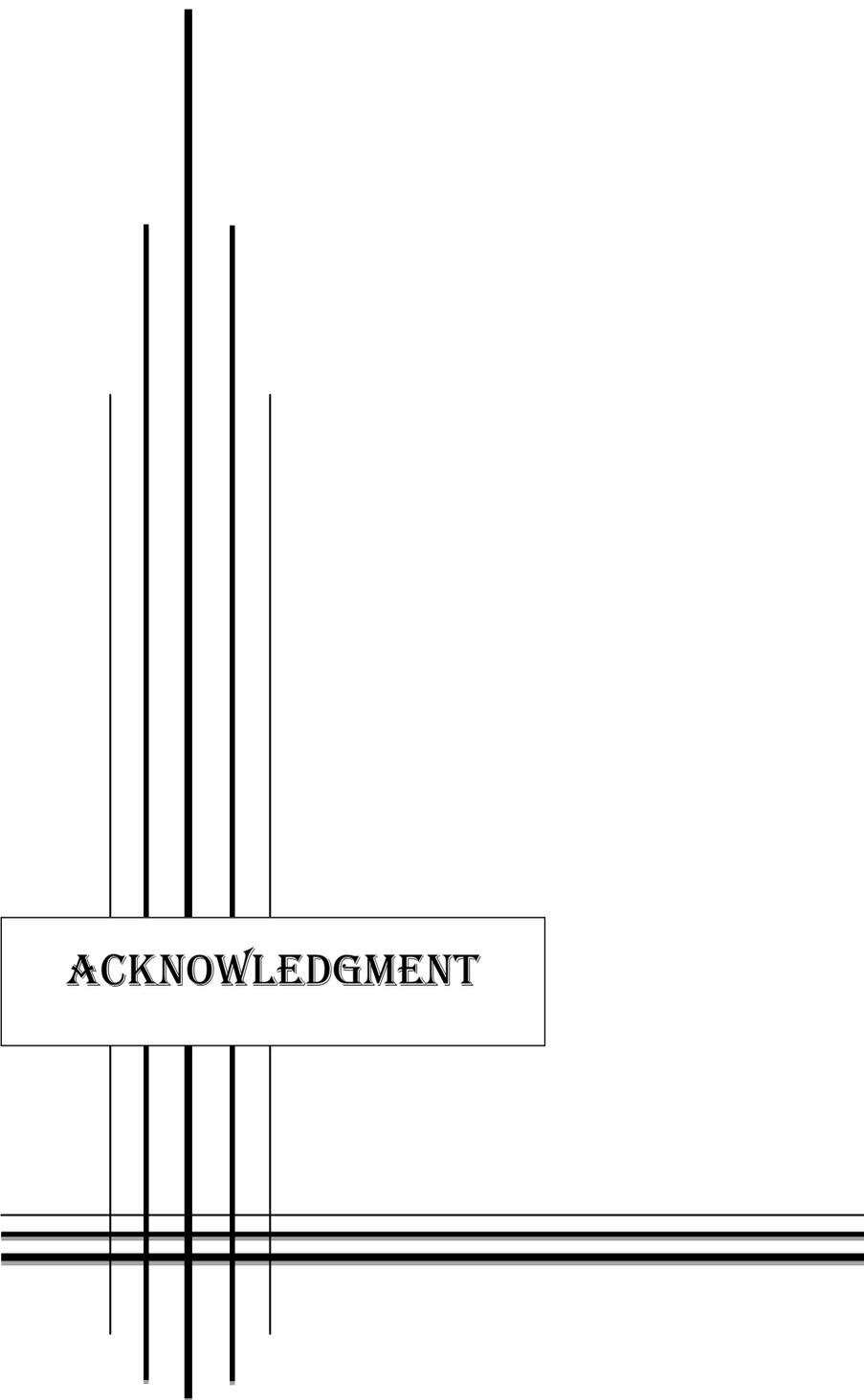
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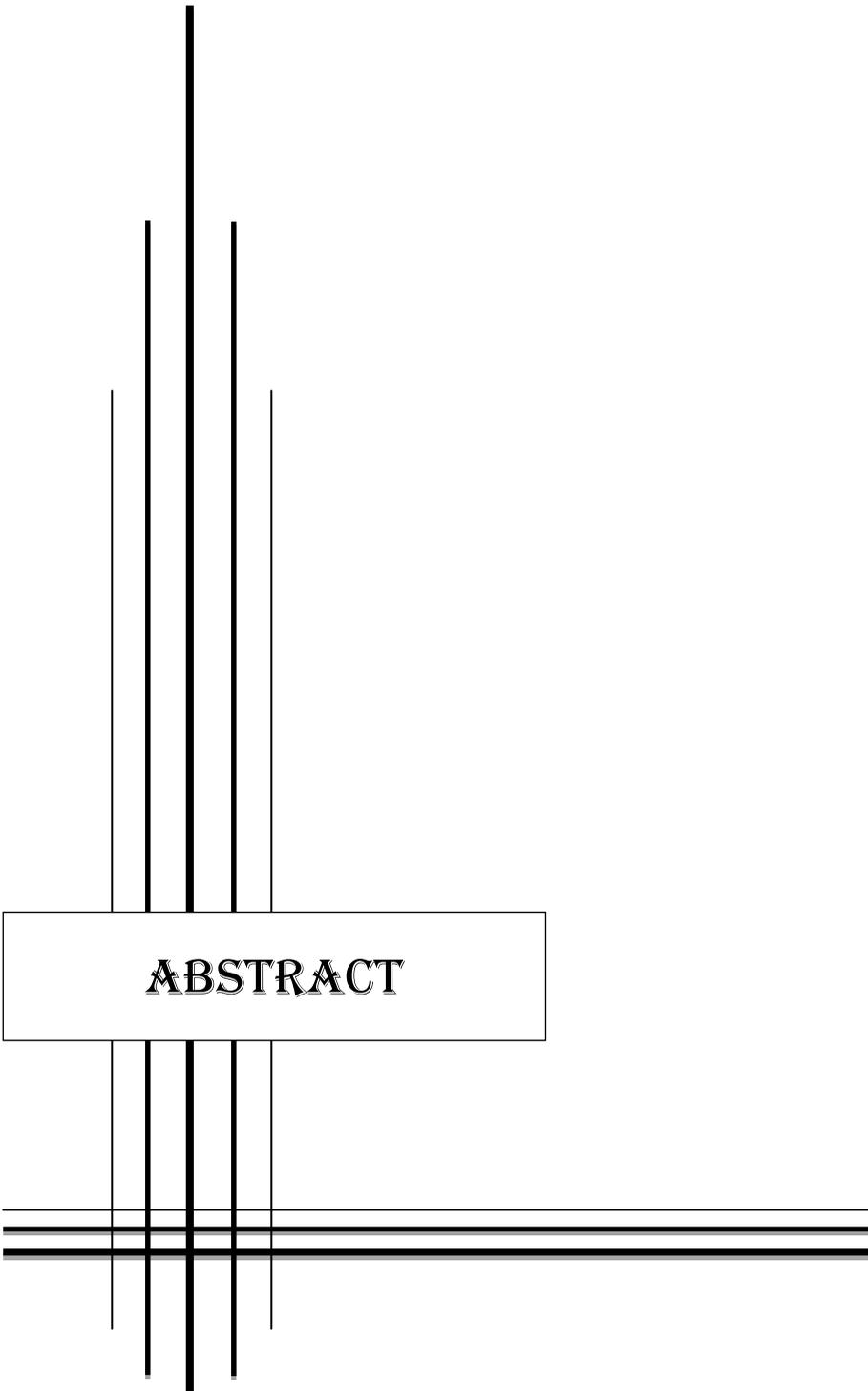
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*I wish to thank **my mother, my father and my brothers** for the support they have given. I know without the support and confidence of my family would never have been able to achieve what I have.*

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**ABSTRACT**

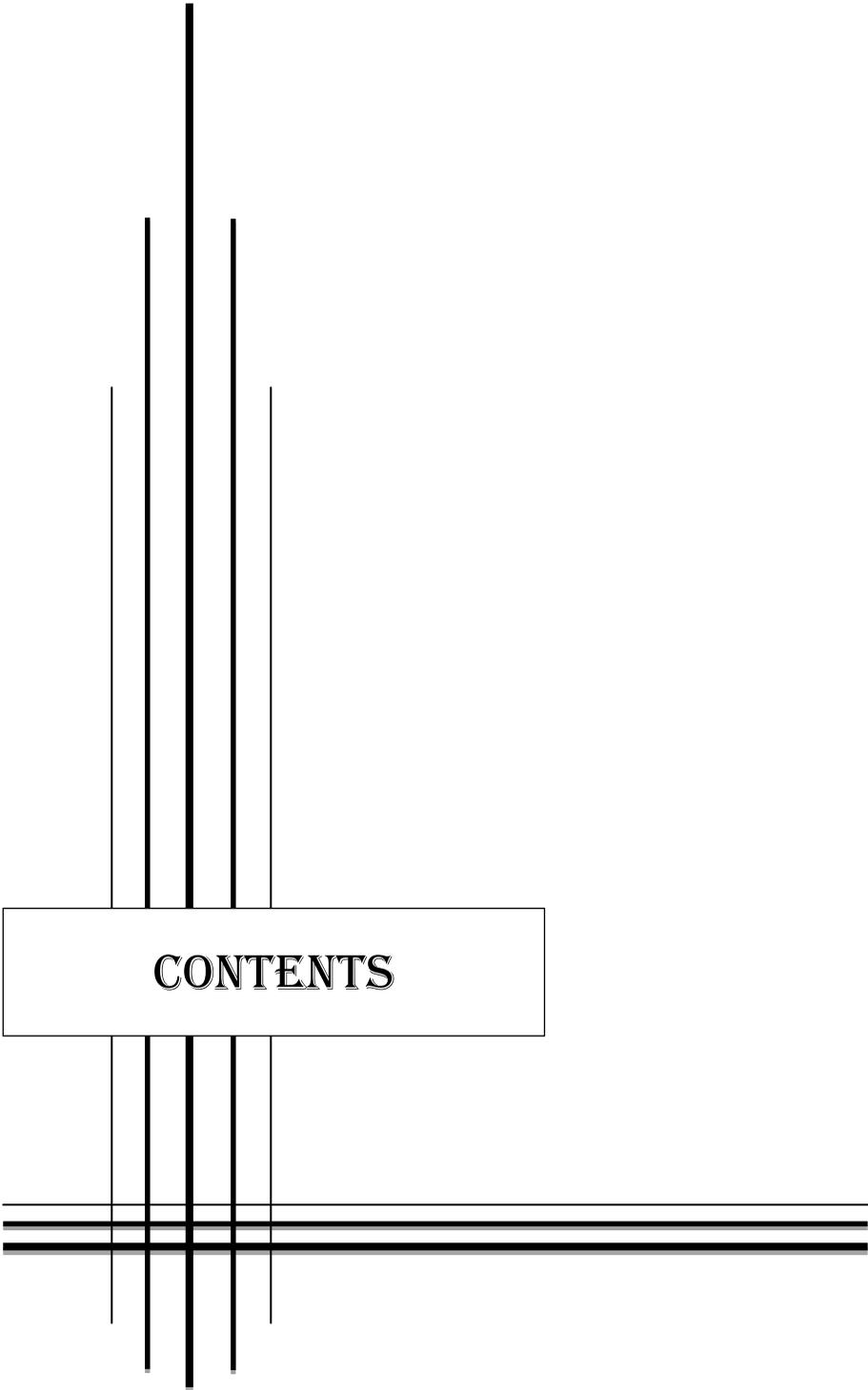


**ABSTRACT**

The solid waste resulted from aluminum sulfate manufacturing can be used as a source of silicate. This waste is called partially de-aluminated metakaolin (PDMK). This work aims at utilizing such waste in synthesis of some zeolites. Cancrinite and Chabazite are two members of zeolites family were synthesized from partially de-aluminated metakaolin. Alumina ratio was adjusted by adding aluminum sulfate. Cancrinite was synthesized by heating and dissolving of PDMK in solution of 4 N sodium hydroxide at 130°C then cooled and filtered . A solution of aluminum sulfate was added to the filtrate, an autoclave for 6 hours at 130 °C and at a pressure of 2.5 atm., then cancrinite was obtained. Chabazite was synthesized by heating and dissolving of PDMK in solution of 4N sodium hydroxide at 130 °C then a solution of aluminum sulfate was added ,an autoclaved for 6 hours at 130°C and at a pressure of 2.5 atm. then chabazite was obtained. Cancrinite and Chabazite were characterized using XRD and SEM. Chabazite was used in removal ammonia from synthetic ammonia solution, the removal percentage reach 81 % at room temperature, pH 7, particle size 0.2 mm and contact time 30 min. The experimental results indicated that Chabazite is a promising materials for the removal of ammonia from water.

Key words : kaolin, Cancrinite , Chabazite, partially de-aluminated kaolin, sodium hydroxide, XRD, SEM, aluminum sulfate , silica, alumina.





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