بسم الله الرحمن الرحيم

# شبكة المعلومـــــات الجامعية

# التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

# جامعة عين شمس

## التوثيق الالكتروني والميكروفيلم

## ﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

## يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

**To be kept away from dust in dry cool place of**
**15 – 25c and relative humidity 20-40 %**

# بعض الوثائق الأصلية تالفة


# بالرسالة صفحات

# لم ترد بالأصـــل

# NUCLEAR MAGNETIC RESONANCE STUDY OF LITHIUM SULPHATE BASED SOLID ELECTROLYTES

*A Thesis*

*Submitted to the Faculty of Science*
*Ain Shams University*
*For the Award of the Ph.D. Degree in Science*

*BY*

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**Ain Shams University**
**Faculty of Science**
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***Title of thesis :***

# Nuclear Magnetic Resonance Study of Lithium Sulphate Based Solid Electrolytes

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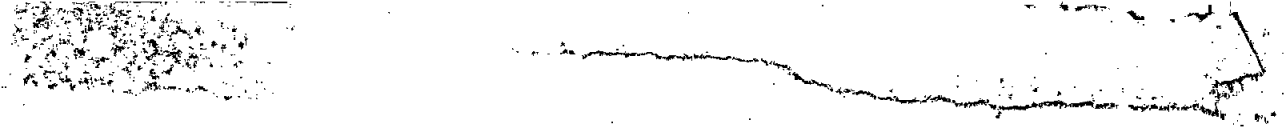

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# ABSTRACT

Nour, Mohamed Abdel Aziz, on Nuclear magnetic Resonance study of lithium sulphate based solid Electrolytes. Unpublished Doctor of Philosophy dissertation, University of Ain shams, Abassia, Egypt.

The main purpose of this dissertation is for pulsed nuclear magnetic resonance study and investigation of lithium sulphate and its solid solutions which exhibit fast ion conductivities. In the monoclinic phase Lithium sulphate "Anhydrous" has been studied using NMR technique .The spin lattice and spin-spin relaxation times has been measured at different temperatures between 298K and 825 K at frequencies 12.37 and 21 MHz

In the cubic phase measurements of the spin lattice relaxation time has been made from the transition temperature to the melting point. It was impossible to measure the spin-spin relaxation time for the cubic phase

Assuming that paramagnetic relaxation is irrelevant in the sample, the strong relaxation which is stronger than that caused by dipolar interaction, and which was observed in the cubic phase is attributed to the quadrupolar relaxation by translational diffusion due to the extra vacancies octahedral positions and also due to the rotation of the sulphate ions in the lithium sulphate solid. The measurement of the relaxation time in the lithium sulphate doped with lithium tungestate confirms this idea.

Studies have also been made of the lithium sulphate-zinc sulphate system using NMR technique.

*Key Words*

NMR (nuclear magnetic resonance,), Solid electrolytes, Fast ion conductors = Superionic conductors and Solid state batteries.

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