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Change of Electric Permittivity of Mica Due to the Change of Its size

A Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Science in Physics

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Dedication

To my great mother

To my dear father

To my beloved brother, sisters, and husband

To all of my friends and colleges

Acknowledgement

I humbly acknowledge with all gratitude and appreciation to my supervisor Prof. Mubarak Dirar Abdullah, who never seized to monitor and guide me till the successful completion of this work.

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Abstract

The effect of particle size and density on electric permittivity of mica was investigated. The investigation was carried on five samples with different grinding time. The study was based on experimented and analytical method. The samples were prepared in a powder form there inserted between two capacitor plates. The two plates surrounded by capper wooden plates form hollow rectangular box.

The reading of current and voltage for capacitor were used to find the capacitor for each sample. The results obtained showed a direct proportionality between voltage and current for all samples. The permittivity of the powder was calculated from voltage-current results. The relation between permittivity and grinding time shows proportional then inverse relation. This indicates the existence of many mechanisms that relate the two parameters. The increase of permittivity with grinding time may be related to the effect of grinding time on increasing the number of electric dipoles that align themselves in the field direction. But the decrease may result from the decrease of powder density.

مستخلص البحث

تمت دراسة تأثير حجم الجسيم وكثافته علي السماحيه الكهربيه للمايكا. وقد أجريت هذه الدراسه علي خمس عينات بازمان سحن مختلفه. وقد إعتمدت هذه الدراسه المنهج التجريبي والتحليلي . هذه العينات حضرت كمسحوق تم إدخاله بين طرفي لوحي مكثف نحاسي . هذين اللوحين محاطه بالواح خشبيه شكلت صندوقا مستطيلا اجوفا.

وقد أستخدمت قراءات الجهد والتيار للمكثف لإيجاد سعته وقد بينت النتائج التناسب الطردى بين الجهد والتيار لكل العينات . وقد تم إيجاد سماحية المسحوق من سعة مكثف المسحوق والهواء وقد إتضح أن العلاقه بين السماحيه وزمن السحن طرديه في البدايه لتصبح عكسيه بعد ذلك وهذا يوضح وجود أكثر من أليه تربط العلاقه بينهما .

فزيادة السماحية بزيادة زمن الشحن ربما يكون بسبب أن تأثير زيادة زمن السحن يكون هو زيادة عدد ثنائيات الأقطاب الكهربيه في إتجاه المجال. أو العلاقه العكسيه فربما تكون بسبب قلة كثافة جسيمات المسحوق .

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