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In this study, aluminium titanate (Al_2TiO_5) has been prepared by the sol gel method. It has been intended for use as a ceramic filler in order to investigate how it affects conductivity and dielectric properties and also the nature of the complexes. Chitosan has been used as the host with ammonium thiocyanate (NH_4SCN) as the salt to supply the conducting ions. Films of chitosan acetate (CA) , CA-NH_4SCN complexes, CA-Al_2TiO_5 complexes and CA-NH_4SCN-Al_2TiO_5 complexes were prepared. The electrical conductivity of all samples has been calculated using the bulk resistance value obtained from the complex impedance plot in the frequency range between 50 Hz to 1 MHz. The film 60 wt.% chitosan – 40 wt.% NH_4SCN system exhibits the highest room temperature electrical conductivity of 1.38 x 10^{-4} S cm^{-1}. The highest electrical conductivity of the chitosan-NH_4SCN-Al_2TiO_5 is 2.10 x 10^{-4} S cm^{-1} for the film containing 5 wt.% Al_2TiO_5 at room temperature, 25 ^oC. The modulus formalism indicates that the samples of chitosan-based electrolytes are ionic conductors. Infrared (IR) spectroscopy shows the occurrence of chitosan-salt complexation. X-ray diffraction (XRD) confirms that the Al_2TiO_5 filler sample with the highest electrical conductivity is the most amorphous. This is supported from the result of scanning electron microscopy (SEM). Hence the effect of Al_2TiO_4 filler is increment of conductivity and changing the degree of amorphousness of the highest conducting chitosan-NH_4SCN system.

Dalam kajian ini, aluminum titanate (Al_2TiO_5) telah dihasilkan dengan menggunakan kaedah sebatian gel. Tujuan penghasilan Al_2TiO_5 adalah sebagai agen penambah dalam usaha untuk mengkaji kesan terhadap konduktiviti dan sifat dielektrik serta kesan terhadap sifat semula jadi kompleks. Kitosan telah digunakan sebagai perumah dengan ammonium thiocyanate (NH_4SCN) sebagai garam pendop untuk membekalkan ion yang berkonduksi. Filem kitosan asetat (CA), kompleks CA-NH_4SCN, kompleks CA-Al_2TiO_5 dan kompleks CA-NH_4SCN-Al_2TiO_5 telah dihasilkan. Kekonduksian elektrik bagi semua sampel dikira daripada nilai rintangan pukal yang boleh diperolehi daripada plot impedans kompleks dalam julat frekuensi 50 Hz hingga 1 MHz. Filem yang mengandungi 60 wt.% kitosan-40 wt.% NH_4SCN menunjukkan nilai kekonduksian elektrik tertinggi sebanyak 1.38×10^{-4} S cm^{-1} pada suhu bilik. Nilai kekonduksian elektrik yang tertinggi pada suhu bilik bagi sistem kitosan-NH_4SCN-Al_2TiO_5 adalah 2.10×10^{-4} S cm^{-1} bagi filem yang mengandungi 5 wt% Al_2TiO_5. Tata modulus (modulus formalism) menunjukkan bahawa sampel-sampel elektorlit berasaskan kitosan merupakan konduktor ionik. Spektroskopi inframerah (IR) menunjukkan berlakunya kompleks antara kitosan-garam. Pembelauan sinar-x (XRD) mengesahkan bahawa sampel agen penambah Al_2TiO_5 dengan kekonduksian elektrik tertinggi adalah paling amorfus. Ini disokong oleh keputusan yang diperolehi daripada spektroskopi pengimbasan electron (SEM). Oleh itu, kesan agen penambah (Al_2TiO_5) adalah peningkatan kekonduksian dan perubahan darjah keamorfusan bagi sistem kitosan-NH_4SCN yang mempunyai nilai kekonduksian tertinggi.

List of Poster Presentation Presented at Conference:

1. **F. Hassan**, S. R. Majid and A. K. Arof, "Synthesis and characterization of Al_2TiO_5 by sol-gel method", presented at the National Workshop on Functional Materials (NWFM), 20-21 Jume 2009, university of Malaya, Kuala Lumpur.