COLLOIDAL STABILITY OF GOLD NANOPARTICLES IN ORGANIC AND AQUEOUS MEDIA

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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SUPERVISOR'S CERTIFICATION

We declared that we read this thesis and in our point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

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ABSTRACT

Gold nanoparticles (AuNPs) is the most stable metal nanoparticles but they have a tendency to agglomerate. When agglomeration occur, the stability of the gold nanoparticles is decreasing. In order to prevent the agglomeration, a stabilizer need to be introduce into the system. Colloidal stability is the main parameter in order to prevent the agglomeration of gold nanoparticles. Steric or electrostatic stabilization need to be introduced to increase the stability of the gold AuNPs. In this work, the main objectives is to characterize the physical properties of the AuNPs in both organic and aqueous media after it is being synthesise by using the citrate reduction method. On the other hand, The effect of the temperature and time is being investigated in order to know the size and the stability of the AuNPs. The gold nanoparticle initially will be synthesised by using sodium citrate reduction method and refer as the gold precursor before it is further dissolved in the organic media, dimethylformamide (DMF). The naked AuNPs and the AuNPs that is dissolved in the organic media will be analysed by using TEM, Zeta Sizer and UV-*vis*. The maximum peak appeared at 0.8447 Å and maximum wavelength of 522 nm is observed from the UV-*vis* analysis. The AuNPs are well dispersed on the organic media but there are some agglomeration occur where the particles size distribution is approximately 3.5 nm. From the observation, the optimum temperature for AuNPs in both organic and aqueous media are 35 °C.