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Synthesis of Useful Contamination-Free Silver Nanoparticle Suspensions by Using Polyoxometalate

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The objective of this article is to using a Keggin polyoxometalate, $H_3PW_{12}O_{40}$, at different cocentration, in chemical photoreduction of silver nitrate to synthesize silver nanoparticle suspension. In this method, Formaldehyde and PVP were used as reductant and stabilizer, respectively and Keggin acid has the role of promoter. The sizes of prepared silver particles were around 2–20 nm. According to our results, control of the size of the particles can be achieved via POM concentration. By increasing the Keggin concentration, the size of synthesized nanoparticles reduced and the particles made from the more amount of $H_3PW_{12}O_{40}$, had smaller sizes. The products were mainly characterized for its particle size distribution to provide information on the optimal conditions of synthesis and sufficient stability against coagulation. Finally, silver nanoparticles were characterized by transmission electron microscopy (TEM), x-ray diffraction (XRD) and UV visible. The suspensions of silver nanoparticles prepared by this method are free from any metal ion contamination, and are suitable for use in semiconductor industry. The suspensions is suitable to making micro-interconnects in integrated circuits (IC) devices by ink-jet printing.

Keywords: Silver, Nanoparticle, POM, Keggin, Suspension

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Synthesis, purification,charactrization and biological activity studies of acephate

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Acephate is a contact, stomach and systemic insecticide and acaricide, which has intensive effect on insects. This pesticide reduces the activity of nerve system important enzyme, acetyl cholinesterase, in insects and livings. Because of this, it is used against differences of sucking and biting insects in ornamental plants, vegetables and fruits. In this paper, acephate (V), has been synthesized in four steps, in the first step synthesis of O, O- dimethyl phosphorochloridothioate (II), of starting materials methanol and thiophosphorylchloride (I), and then ammonization of O, O-dimethylphosphorochloridothioate, and then intermolecular rearrangement of O, O- dimethyl phosphoroaminothioate (III) by methylation agents, and end step is acetylating of O, S- dimethyl phosphoroaminothioate (IV), by anhydride acid agents. After investigation of the influence of different factors in the reaction such as temperature, time, solvent and mol ratio of the reactants and purification of products ,The structure of synthetic compounds have been characterized by ^{31}P, $^{31}P\{H\}$, ^{1}H, ^{13}C-NMR and IR spectroscopy and GC-Mass. PASS software (1.193 version) has been used for prediction of biological potency of synthetic compounds. The probability of their insecticidal activity and acetylcholineesteras inhibition in human and contribution of atoms in reduction or rising of acetylcholineesteras inhibition were also investigated.

Keywords: Acephate, thiophosphorylchloride, insecticide, inhibition, biological, PASS software

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