

Turkish Journal of Chemistry

Turkish Journal

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Synthesis and characterization of gold nanoparticles supported on zinc oxide via the deposition-precipitation method

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Abstract: Gold nanoparticles supported on zinc oxide nanoparticles were synthesized at several pH levels via the deposition-precipitation (DP) method. The effects of pH on gold loading, particle size, and particle size distribution on the support were studied at the iso-electric point (IEP) as well as below and above the IEP of ZnO. The addition of the support significantly changed the pH of the solution. The effects of adjusting the pH before and after the addition of the support into the gold chloride solution were also investigated. Gold particles with diameters of less than 5 nm were obtained. The results revealed that gold loading depends on the pH, while gold particle size and distribution are independent of pH adjustment. Structural and elemental characterizations of the gold nanorods were carried out using X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), energy-dispersive X-rays (EDX), atomic absorption spectrometry (AAS), and ultraviolet-visible spectrophotometry (UV-Vis).

Key Words: Au nanoparticles, ZnO nanorods, deposition-precipitation, electron microscopy, X-ray diffraction

Turk. J. Chem., **34**, (2010), 639-650.

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