

# Characterization of Crystal Size of Palladium Nanoparticles by XRD, SAXS, SP-ICP-MS and SEM

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## Abstract

Due to increased emissions of palladium nanoparticles in recent years, it is important to develop analytical techniques to characterize these particles. Currently not many materials are commercially available which could act as reference materials, that why, Polyvinylpyrrolidone (PVP) stabilized palladium nanoparticles were synthesized through reduction of palladium chloride by tetraethylene glycol (TEG) in the presence of KOH. Four different methods were selected for particle size analysis of the palladium nanoparticles. Palladium suspensions were analyzed by scanning electron microscopy (SEM), small angle X-ray scattering (SAXS), single-particle ICP-MS (SP-ICP-MS) and X-ray diffraction (XRD). Secondary particles between 30 nm and 130 nm were detected in great compliance with SAXS and SP-ICP-MS. SEM analysis showed that the small particulates tend to form agglomerates.