

A Dihydropyridine Derivative as a Highly Selective Fluorometric Probe for Quantification of Au³⁺ Residue in Gold Nanoparticle Solution

Authors : Waroton Paisuwan, Mongkol Sukwattanasinitt, Mamoru Tobisu, Anawat Ajavakom

Abstract : Novel dihydroquinoline derivatives (DHP and DHP-OH) were synthesized in one pot via a tandem trimerization-cyclization of methylpropiolate. DHP and DHP-OH possess strong blue fluorescence with high quantum efficiencies over 0.70 in aqueous media. DHP-OH displays a remarkable fluorescence quenching selectively to the presence of Au³⁺ through the oxidation of dihydropyridine to pyridinium ion as confirmed by NMR and HRMS. DHP-OH was used to demonstrate the quantitative analysis of Au³⁺ in water samples with the limit of detection of 33 ppb and excellent recovery (>95%). This fluorescent probe was also applied for the determination of Au³⁺ residue in the gold nanoparticle solution and a paper-based sensing strip for the on-site detection of Au³⁺.

Keywords : Gold(III) ion detection, Fluorescent sensor, Fluorescence quenching, Dihydropyridine, Gold nanoparticles (AuNPs)

Conference Title : ICOS 2023 : International Conference on Organic Synthesis

Conference Location : Rome, Italy

Conference Dates : June 05-06, 2023