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# Porphyrins in Competition with their Nanomaterials Containing PtNPs and AuNPs. Synergism for the Benefit of Sensing Applications †

**Eugenia Fagadar-Cosma**

Institute of Chemistry "Coriolan Dragulescu"of Romanian Academy, M. Viteazul Ave. 24, 300223-Timisoara, Romania; efagadar@yahoo.com

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Due to their amazing optoelectronic properties, porphyrins have intrinsic sensing properties that might be highly improved when they are associated with a proper partner, such as platinum nanoparticles PtNPs or gold nanoparticles AuNPs. A novel optical sensor destined for uric acid detection was developed based on a nanomaterial realized from tetra-(4-amino-phenyl)-porphyrin (TAPP), complexed with PtNPs. PtNPs was obtained by a double reduction method, using trisodium citrate the first time and $NaBH_4$ the second time in order to tailor its shape and size. The TAPP porphyrin-PtNPs hybrid nanomaterial optically detects uric acid with a high confidence, selectivity, and sensitivity in the range of $5 \times 10^{-6}$–$1.6 \times 10^{-5}$ M, which is in the targeted domain of medical relevance tests in biological samples. Another sensor, capable of optically detecting trace amounts of triiodide ion, in the nM range, was based on a nanomaterial organized in a 1D supramolecular arrangement, with large voids of uniform size, that are favoring analyte ions recognition, obtained from Pt(II)-tetra(4-methoxy-phenyl)-porphyrin [1] complexed with plasmonic nanoparticles of AuNPs. Taking into consideration that an excess of uric acid leads to kidney disease, cardiovascular disease, hypertension, and a risk factor for 2-type diabetes, and that iodine deficiency, besides other disorders, can result in infant congenital hypothyroidism, their precise determinations are of great importance in clinical laboratory medicine. The effect of interfering ions was investigated, and neither of the two nanomaterials are not blocked by common ions, lipids, or amino acids and not even by salicylate anion, which is highly present in biological samples.

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## References

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