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Plant materials mediated microwave synthesis of iron oxide nanoparticles

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Microwave-assisted hydrothermal synthesis is a method that has been showing increasing interest among scientists, mainly because of its simplicity, reduction in synthesis time, and, most importantly, the ability to control synthesis conditions. Manipulating with synthesis conditions, for example by adding different substances such as natural plant materials, it is possible to control the size, shape, and composition of the final product. Implementation of various plant materials in the synthesis process has attracted much attention due to their environmentally friendly and non-pathogenic nature of product obtaining and thus represents the latest trend in the development of green synthesis techniques.

The hydrothermal microwave method was used for the synthesis of iron oxide nanoparticles in highly alkaline media with the addition of plant material from Dalmatian herbs. Product characterization was performed by Fourier Transform Infrared Spectroscopy (FTIR) and Powder X-ray Diffraction (PXRD), followed by Rietveld analysis to determine the composition and crystallography of the particles. To obtain information on the morphological characteristics of the product, such as the size and shape of the particles, a Field Emission Scanning Electron Microscope (FE-SEM) was used.

Recent Publications

1. Paut, A.; Prkić, A.; Mitar, I.; Guć, L.; Marciuš, M.; Vrankić, M.; Krehula, S.; Tomaško, L.(2022) The New Ion-Selective Electrodes Developed for Ferric Cations Determination, Modified with Synthesized Al and Fe-Based Nanoparticles. *Sensors*, 22, 297.
2. Mitar, I.; Guć, L.; Soldin, Ž.; Vrankić, M.; Paut, A.; Prkić, A.; Krehula, S.(2021) Rapid Microwave Method for Synthesis of Iron Oxide Particles under Specific Conditions. *Crystals*, 11, 383
3. Paut, A.; Prkić, A.; Mitar, I.; Bošković, P.; Jozić, D.; Jakić, M.; Vukušić, T. (2021) Potentiometric Response of Solid-State Sensors Based on Ferric Phosphate for Iron(III) Determination. *Sensors*, 21, 1612.
4. Ristić, M., Kuzmann, E., Homonnay, Z. et al.(2020), Hydrolysis of Fe(III) in the presence of mixed anions and promoters. *J Radioanal Nucl Chem* 324, 1293–1302 .
5. Radić, J.; Bralić, M.; Kolar, M.; Genorio, B.; Prkić, A.; Mitar, I.(2020) Development of the New Fluoride Ion-Selective Electrode Modified with Fe_xO_y Nanoparticles. *Molecules*, 25, 5213.

Biography

Ivana Mitar received her Ph.D. in Chemistry from the Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia. She is an Assistant Professor at the Faculty of Science, University of Split, Croatia. She is an expert in structural, spectroscopic, and microscopic analysis (FT-IR, Mossbauer, UV-Vis-NIR, EDX spectroscopy, FE-SEM). Her scientific field of work is analytical chemistry, and her scientific interests are chemical synthesis, material characterization, and heat treatment.

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