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Room Temperature FePt Nanoparticles Formation Kinetics during Laser Solution Photolysis

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Abstract content
   (Max 300 words)

Ultra-small spherical and highly polycrystalline particles of FePt were synthesized with d-spacing of about 2.50 Angstroms. The effect of ultra-violet laser on temperature and chemical process on FePt nanoparticles formation during photolysis was investigated. During the laser irradiation, temperature measurements were performed using an infrared GOBI camera. It was found that there are no significant temperature changes during laser irradiation of the precursor. The measured temperature was found to be 300 K ± 001 K. This was comparable with the temperature of the background temperature. The FePt nanoparticles formation which is based on resonant and selective bond dissociation are due to an effect of laser pressure and photo-chemical process. The presented energy-balance equation first from Haggerty & Cannon (1981) and also modified by Mwakikunga et al. (2011) was modified to new energy-balance equation to suit our results. From this newly modified equation it was found that the creation of positive of ion is linear with UV laser intensity whereas the electrons prove to have more uncertainties. From the theory fit of the new energy-balance equation to the experimental data for positive ions and electrons, the parameters enthalpy of dissociation of FePt was found to be 9.006E-6 J/mol and 8.375E-6 J/mol respectively. Prior to laser photolysis, the fit suggest that the solution contains few ions 0.15671 ± 0.0107 and 0.08828 ± which were attributed to the background light. The effect of background light on positive ions and electrons creation was also quantify to be 1.6238 ± 0.1113E-12 J/mol and 0.8500E-12 J/mol respectively.

Apply to be
 consider for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

Main supervisor (name and email)
and his / her institution

Bonex Mwakikunga and bmwakikunga@csir.co.za and CSIR DST/NCNSM Pretoria

Would you like to
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Yes

Primary author: Mr NKOSI, Steven (University of the witwatersrand)

Co-authors: Prof. FORBES, Andrew (CSIR/NLC); Dr MWAKIKUNGA, Bonex (CSIR DST/NCNSM); Prof. SIDERAS-HADDAD, Elias (University of the Witwatersrand)

Presenter: Mr NKOSI, Steven (University of the witwatersrand)

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