Proceedings International
Platinum Open Access Journal (ISSN 2668-6384)

Proceedings, Abstract
Volume 3, Issue 4, 2021, 92
https://doi.org/10.33263/Proceedings34.092092

Microwave-Assisted Synthesis of Mg Doped Cobalt Ferrite For Degradation of Reactive Turquoise Blue G Dye †

Parth Shah [1,*], Femina Patel [1,*], Manan Shah [2], Ashish Unnarkat [2], Bhavna Soni [3]

[1] Department of Chemical Engineering, Vishwakarma Government Engineering College, Ahmedabad, Gujarat, India; shahparth2100@gmail.com (P.S.), drfeminpatel@gmail.com (F.P.);
[2] Department of Chemical Engineering, School of Technology, Pandit Deendayal Energy University, Gandhinagar, Gujarat, India; manan.shah@spt.pdpu.ac.in (M.S.), Ashish.Unnarkat@sot.pdpu.ac.in (A.U.);
[3] Department of Chemical Engineering, SAL College of Engineering, Ahmedabad, Gujarat, India; bhavna.soni@sal.edu.in (B.S.);
* Correspondence: shahparth2100@e-mail.com (P.S.); drfeminapatel@gmail.com (F.P.);
† Presented at International e-Conference on Green Chemistry and Engineering towards Sustainable Development – An Industrial Perspective (16-18 June 2021), Surat, Gujarat, India
Received: 5.06.2021; Revised: 10.06.2021; Accepted: 12.06.2021; Published: 15.06.2021

Abstract: Effect of the Mg^{+2} doping on physicochemical properties and the dye degradation efficiency under visible light irradiation of Cobalt Ferrite spinel is reported. Cobalt Ferrite ($CoFe_2O_4$) and doped Cobalt Ferrite ($Co_{1-x}Mg_xFe_2O_4$, x = 0.0,0.2,0.4,0.6,0.8,1.0) were synthesised via Microwave Solution Combustion route using urea as fuel. Prepared catalysts were characterized by FTIR, PSA, XRD, and UV-DRS. FTIR spectra confirm the formation of cubic structure in the prepared samples. It was observed that as dopant loading increases, the bandgap reduces. There not much effect was observed on the magnetic properties of ferrite. Because of the ferromagnetic nature of catalysts, these are easy to separate at the end of treatment. Reactive Turquoise Blue G (RB21) dye was used to investigate dye degradation efficiency as a model dye. , The photocatalytic dye degradation efficiency of catalysts was investigated by varying different parameters such as dye dosage, catalyst dosage, pH of dye solution. Better dye degradation efficiency was observed for x = 0.6, i.e. $Co_{0.4}Mg_{0.6}Fe_2O_4$ with 300ppm catalyst dosage, natural pH for 40ppm dye solution. And photocatalytic dye degradation efficiency of catalyst retains till 4runs afterwords small reduction because of the strong absorption of dye and intermediates on catalytic sites.

Keywords: spinel; doped spinel; Reactive Turquoise Blue G; visible light; photocatalysts; Mg doping.

Funding

This research was funded by Student startup and Innovation Policy, grant number VGEC/SSIP/2020-21/PoC/CHEM/1/4.

Acknowledgments

We are thankful to Pandit Deendayal Energy Univery to provide analytical facilities for characterization of catalysts.

Conflicts of Interest

The authors declare no conflict of interest.