

## Fenton degradation of methylene blue (MB) using Nanosized ZSM-5 type ferrisilicate

Mohammad Ghadiri<sup>a,\*</sup>, Aida Rahmati<sup>a</sup>, and Taha Salehi<sup>a</sup>

<sup>a</sup>Department of Chemistry, Faculty of Renewable Energies, Urmia University of Technology, Urmia, Iran

\*E-mail: m.ghadiri@uut.ac.ir

Water pollution caused by synthetic dyes, such as methylene blue (MB), is a significant environmental concern. Advanced oxidation processes (AOPs) have gained attention as effective methods for dye removal due to their high efficiency and ability to degrade complex organic compounds. The Fenton reaction, involving the generation of hydroxyl radicals (OH<sup>•</sup>) through the reaction between hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and ferrous ions (Fe<sup>2+</sup>), is a widely used AOP [1]. In recent years, zeolites have emerged as promising catalysts for enhancing the Fenton reaction's efficiency and reducing its drawbacks [2, 3]. This paper provides an overview of the role of using nanosized ZSM-5 type ferrisilicate in the Fenton reaction for the removal of methylene blue, highlighting their catalytic properties, adsorption capabilities, and potential mechanisms. Our research indicates that synthesized ferrisilicate samples exhibit remarkable catalytic, adsorptive, and stability properties, which make them excellent candidates for enhancing the efficiency of the Fenton process.

This paper discusses the utilization of zeolite as a catalyst in the Fenton reaction to enhance the removal of methylene blue, addressing challenges like: use of zeolites in wastewater treatment, zeolite modifications for enhanced performance and limitations and challenges faced in zeolite-assisted fenton reactions.

**Keywords:** Ferrisilicate zeolites, Fenton reaction, Methylene blue, Advanced oxidation processes, Catalysis, Water treatment

### References

- [1] M. Pereira, L. Oliveira, & E. Murad, *Clay Minerals*, **2012**, 47(3), 285.
- [2] A. Kuntubek, N. Kinayat, K. Meiramkulov, SG. Pouloupoulos, JC. Bear, VJ. Inglezakis, *Processes*, **2020**, 8(4), 471.
- [3] M. Khatamian, A.A. Khandar, M. Haghighi, M. Ghadiri, M. Darbandi, *Powder Technology*, **2010**, 203(3), 503.