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Dye removal from effluents using ZnO photocatalyst recovered from batteries

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Palavras Chave: Recuperação, Pilhas alcalinas, Óxido de zinco, Fotocatalisador, Degradação, Fotocatálise heterogênea.

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Heterogeneous photocatalyst is used in dye removal and photodegradation, employing hydroxyl radicals

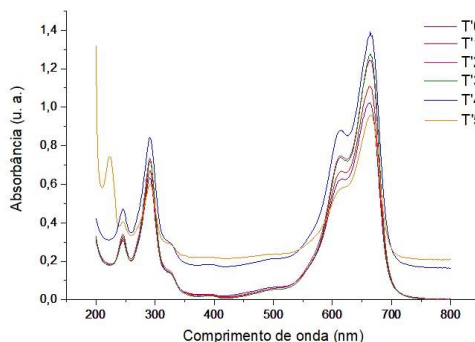
Abstract

Contemporary times have brought an increase in the generation of effluents containing different contaminants, such as dyes. Accessible and simple methods for proper treatment are being studied, among which the heterogeneous photocatalysis oxidative process stands out. This procedure employs hydroxyl radicals and semiconductors activated by radiation to promote degradation (Sousa, 2022).

The contaminant used was methylene blue, and the semiconductor was zinc oxide recovered from spent alkaline batteries. The catalyst efficiency was evaluated through photodegradation assays under different conditions.

The data obtained were analyzed by UV-Vis spectroscopy, generating absorbance graphs, as shown in Figure 1. It was observed that after 90 minutes there was a 66.01% decrease in the 664 nm band (dimethylamino) (Atta, 2024) and a 71.36% decrease in the 292 nm band (aromatic) (Atta, 2024), compared to the initial solution.

Figure 1. Degradation graph of methylene blue by heterogeneous photocatalysis using recovered ZnO semiconductor.



Fonte: a autora.

References

Atta, D.; Wahab, H.; Ibrahim, M.; Battisha, I. Photocatalytic degradation of methylene blue dye by ZnO nanoparticle thin films, using Sol-gel technique and UV laser irradiation. **Scientific Reports**, v. 14, n. 1, 6 nov. 2024. Sousa, J. G. M.; Moraes, N. P.; Goes, C. M., Dantas, G. V. J.; Silva, M; L. C. P.; Rodrigues, L. A. Avaliação das propriedades estruturais e fotocatalíticas de compósitos de g-C₃N₄/ZnO/xerogel de carbono sintetizados com diferentes tipo de tanino. **Revista Matéria**, v. 27, n.1, p. 10, 2022.

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