

# Photocatalytic behavior of ZnAl hydrotalcite functionalized with SDS in phenol degradation

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**1. Introduction** – ZnAl functionalized hydrotalcite based photocatalyst was obtained by the addition of sodium dodecyl sulfate (SDS) during the synthesis of the material by the coprecipitation method and further calcination at 400°C. Bare and modified materials were characterized by X-ray diffraction, IR, UV and XPS spectroscopies and nitrogen adsorption and then, evaluated in the photodegradation of phenol in aqueous phase (40 ppm) under UV light irradiation. An increasing in the photodegradation and mineralization of the phenol molecule was obtained in the functionalized material, which can be attributed to the presence of sulfate ions.

**4. Conclusions** - Modified ZnAl hydrotalcite was obtained by the addition of sodium dodecyl sulfate (SDS) during the synthesis. From the XRD analysis of the materials, an increase in the network parameter *c* when SDS is added, confirms that the surfactant was intercalated in the interlaminal space of the material, and hexagonal zinc oxide (zincite) was formed after the thermal treatment. The modification of ZnAl hydrotalcite by the SDS addition improves the photocatalytic properties of the material. This increase in the photoactivity could be attributed to two factors: first, the decrease in the value of the band gap in the modified material compared to the unmodified material (3.2 vs. 3.0 eV, respectively). Additionally, since the presence of sulphate groups (zinc sulfate mainly and in smaller proportion to aluminum sulphate), observed by the XPS analysis on the surface of the material. In the presence of ultraviolet light irradiation, these sulphate groups (which were retained after the thermal treatment at 400°C). Could generate SO<sub>4</sub><sup>•</sup> radicals, reported as excellent oxidizing agents.

## 5. References

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