



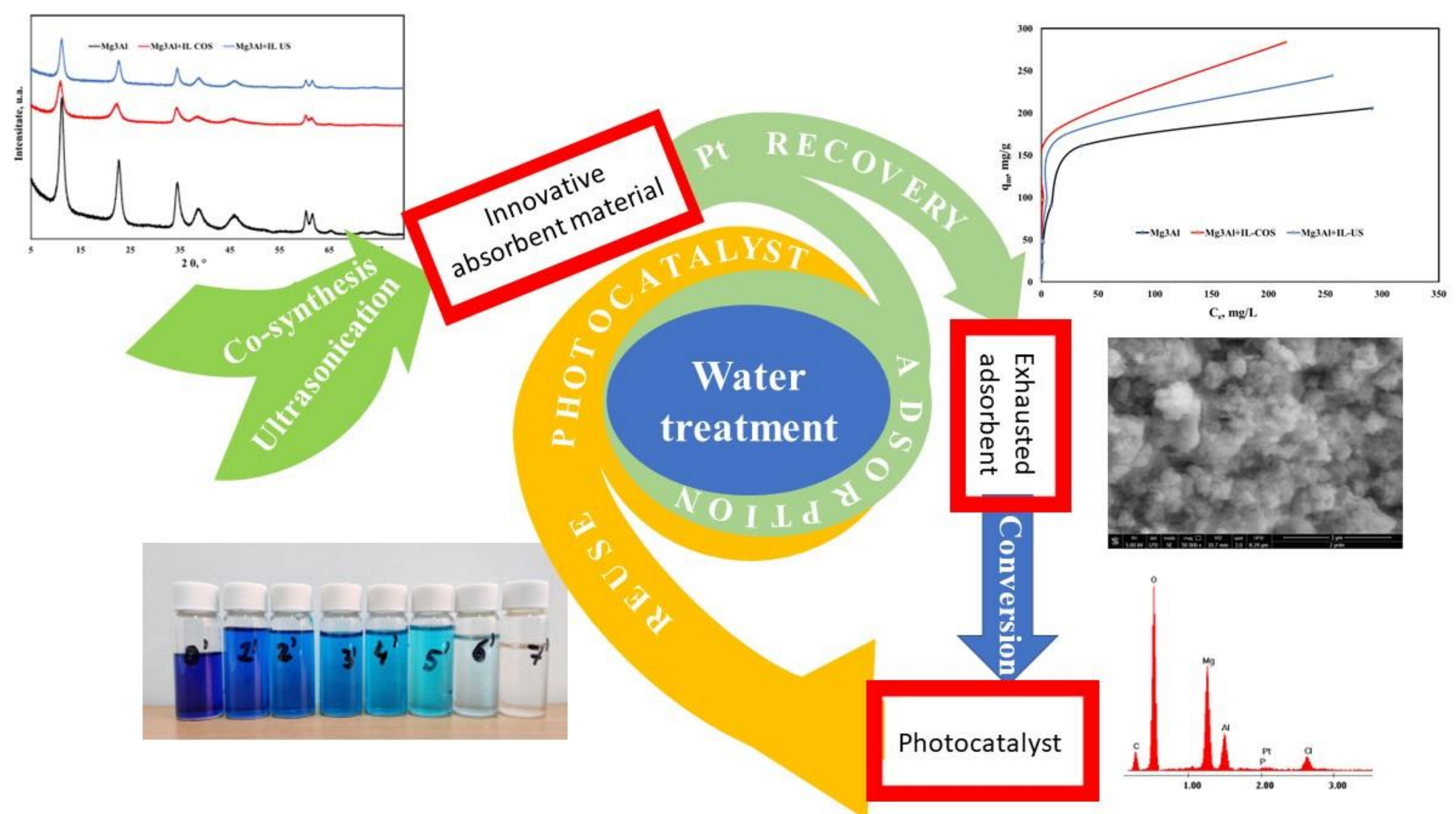
Method of platinum recovery and capitalization from residual aqueous solutions

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Authors: Lupa Lavinia, Coheci Laura, Ţolea Nick Samuel, Lazău Radu

Description

The invention relates to a method of platinum recovering from residual aqueous solutions by adsorption on new and efficient adsorbent materials, followed by their reutilization in the form of photocatalysts in the treatment process of waters containing undesirable organic compounds. The layered double hydroxides (LDH) of Mg_3Al , respectively Zn_3Al functionalized with ionic liquid, trihexyl tetradecyl phosphonium chloride (IL) are used as adsorbent materials.



ADVANTAGES

Allows obtaining materials with significantly improved adsorbent properties by combining the advantages of ionic liquids with the properties of layered double hydroxides.

Total production costs are minimized due to the use of a reduced amount of IL and avoiding their loss in the aqueous phase.

An efficient recovery of Pt from aqueous solutions is achieved, obtaining materials with a content of up to 250 mg Pt/g adsorbent.

Was developed a solution to recycle the adsorbed platinum on synthesized materials by reusing the spent adsorbents as photocatalysts in the degradation process of undesirable compounds from water.

Functionalization of LDH with IL is done by ultrasonication or co-synthesis. The recovery of platinum from aqueous solutions is carried out by adsorption on the newly synthesized materials. The adsorption process proceeds in dynamic mode at a solid:liquid=1:1 ratio, stirring time 60 min, ambient temperature, using aqueous solutions with an initial concentration of platinum ions up to 500 mg/L. The recovery of platinum ions is carried out by using exhausted adsorbent materials with a content of up to 250 mg Pt/g in the form of photocatalysts in the treatment process of waters containing emergent compounds (C_i , dyes ≤ 50 mg/L, C_i , drugs ≤ 250 mg/L and C_i , phenolic compounds ≤ 200 mg/L). The photocatalysis processes take place at a ratio of aqueous solution: photocatalyst = 1 g/L, irradiation time 180 minutes, and ambient temperature. The proposed method is in accordance with the European "green" agreement (European Green Deal: "Clean environment and zero pollution"), proposing a solution that falls within the closed cycle technologies of platinum recovery and revalorization.

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Contact: Lavinia Lupa, email: lavinia.lupa@upt.ro