

A new chelating support based on Textile fiber waste; synthesis, experimental design and characterization

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Abstract

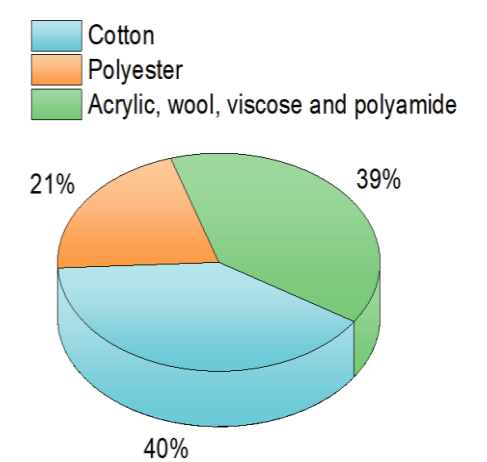
This work is focused on the preparation of a new chelating support based on waste acrylic fiber AF with conversion of nitrile groups into iminodiacetic groups by chemical reaction, moreover the influence of the conditions such as: pH, Temperature, chelation agent concentration and time duration of the reaction on the conversion rate of nitrile groups which has been optimized and achieved by using the JMP (John's Macintosh Project) software.

The results proved the success of the functionalization reaction; the nitrile groups could be transformed into iminodiacetic groups, also reveal that the modification reaction of the production of a new chelating fiber with a low cost. The optimal conditions were obtained by JMP, moreover the characterization showed thermal stability and a successful surface modification.

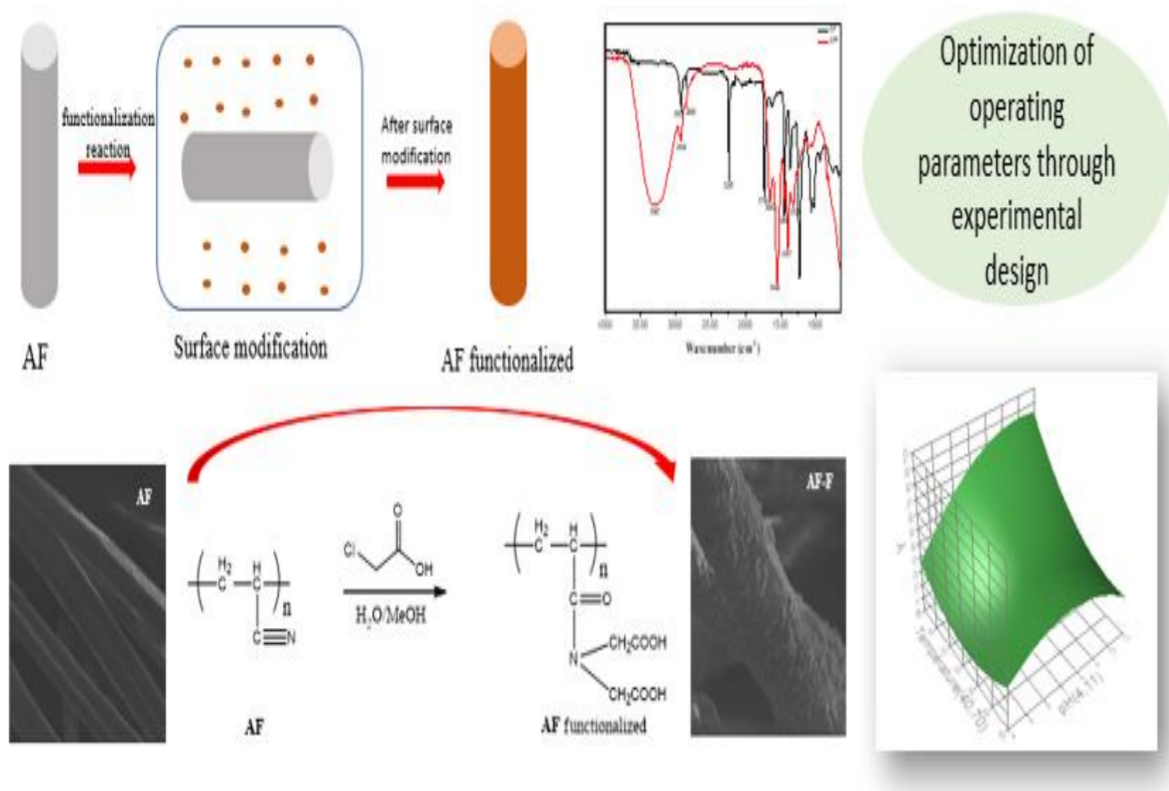
Context

Morocco is one of the main countries with a strong presence in the textile and clothing sector. Currently, the total estimated volume of textile waste generated in Morocco is about 200,000 tonnes per year. The waste generated consists mainly of cotton, polyamide, acrylic, wool and viscose.

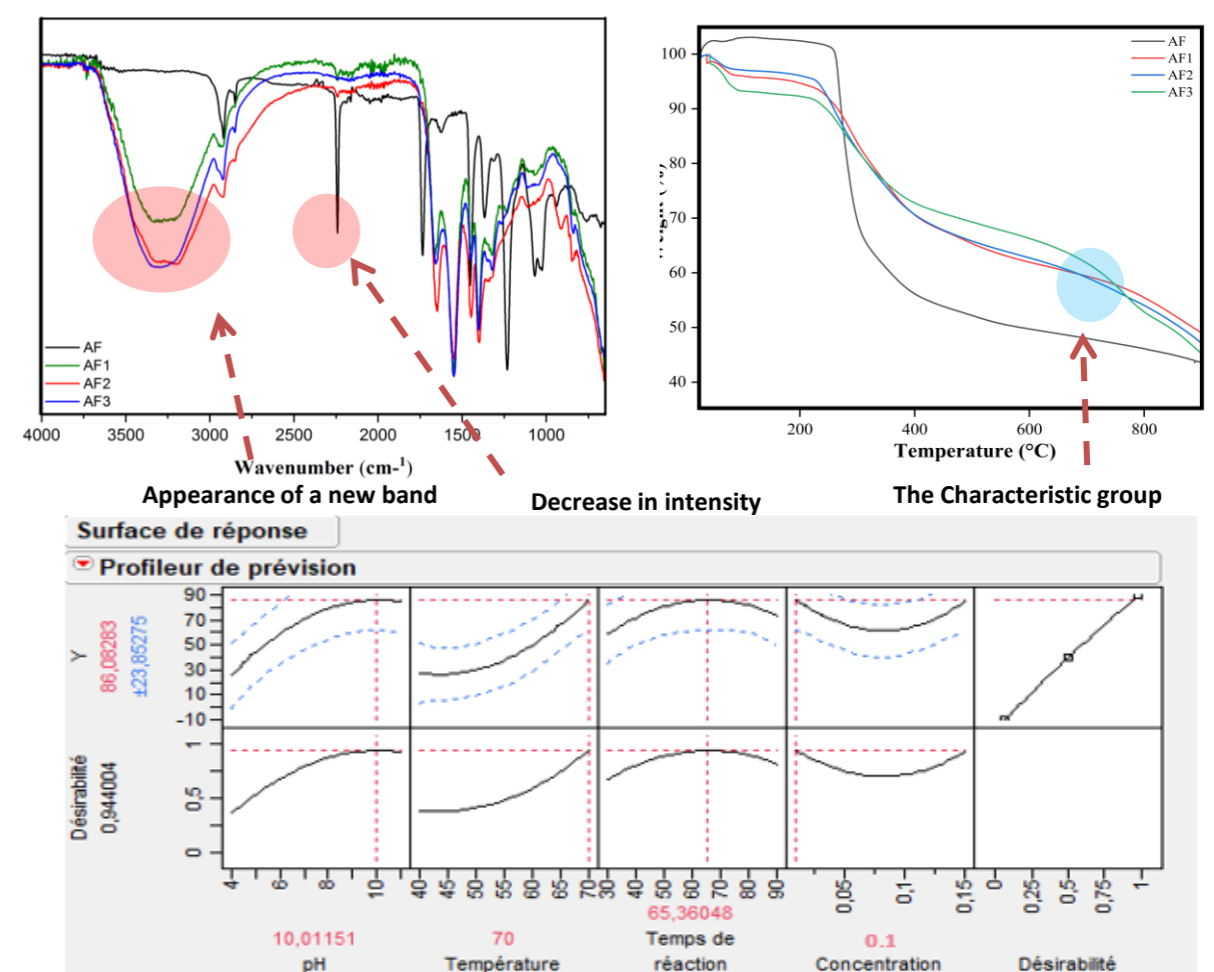
The functionalization of fibers seems to be an interesting alternative to improve the adsorbing power. In response to this problem, work has highlighted the properties of iminodiacetic groups, which have a higher chelating power towards dyes and heavy metals.



Methodology



Results



Conclusion and perspectives

The functionalized waste acrylic fiber was characterized by different analysis techniques in order to confirm the success of the functionalization reaction.

Thus, main results of this study relate the use of acrylic fiber for elaboration of high-performance adsorbent which will be used as an adsorbent of waste water pollutants like heavy metal and industrial dyes. Transformation of textile waste, using that approach for high performance adsorbent synthesis, assures needs to preserve and improve waste water epuration.

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