

Modification and Characterization of Cotton Fibers with Magnetic Core-Shell Mesoporous Silica Nanoparticles

David Patiño-Ruiz
University of Cartagena PhD Program, Cartagena 130001, Colombia

Fabric materials have a wide diversity in the nature in which can be highlighted the cotton as one of the most abundant consisted in 96% of cellulose [1]. The functionalization of cotton avoids facile degradation and damage by the environment, moisture, microorganisms, etc., [2] and allows to obtain a desired material with applications such as medical, construction and textile [3]. Electrostatic assembly better known as layer-by-layer (LbL) technique is an alternative option of cotton modification consisted in depositing nanolayers by the adsorption of charged polyelectrolytes on the surface for further immobilization of nanoparticles [4]. LbL technique is attractive for cotton modification due to its simplicity and its easy incorporation in just one coating at ambient conditions [5]. Nanostructured materials have been investigated in the textile field because of their attracting characteristics and unique physicochemical [6]. Recently, *core-shell* nanoparticles have been focused for the combination of a core and a shell made by different precursors, and which unique and useful functionalities are obtained depending on this interaction affording to expand their applications according to the shape, size and smart characteristics given by these *core-shell* nanostructures [7]. In the present study, we have pretreated and modified cotton fibers using PDDA and PSS polymers in order to functionalize the surface with charged polyelectrolytes for further nanoparticles attaching by electrostatic interaction. Magnetite and Magnetic core-shell mesoporous suspension were prepared for coating the cotton fibers to compare and characterize the resulting material as a novel, innovative and promising product for different fields of application.

Biography

David Patiño Ruiz is a Doctoral Candidate in Engineering with Emphasis in Science and Technology of Materials at the University of Cartagena and Chemical Engineer from the same Institution. The researches directed by him has been focused on the synthesis, characterization and application of nanomaterials for different fields in which includes water and soil treatments, drug load and delivery, among others. He has made oral presentation in different conferences with nanotechnology approaches, and has made research exchanges repeated times in Cornell University with the collaboration of Doctoral Students in order to increase his knowledge in nanomaterials with highly desired characteristics for different purposes.

Presenting author details

Full name: David Alfonso Patiño Ruiz
Contact number: +57 310 8855366
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