

Barium sulfate/amorphous cellulose for X-ray shielding substrate

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รายละเอียดสรุป

This research aimed to produce a substrate of X-ray attenuation using barium sulfate/amorphous cellulose (Ba/AC). The Ba/AC was fabricated by rearranging the eucalyptus pulp from crystalline to amorphous structure. The amorphous cellulose was regenerate with barium compounds to obtain the Ba/AC and investigated the characterization using XRD, SEM, and ATR-FTIR. The X-ray attenuation was studied by mixing 20 %w/w Ba/AC and 80% w/w silicone rubber, associated coat on the cotton fabrics ranging from one layer to five layers including compared to the barium sulfate powder, as a conventional material. The coated fabrics were exposed to X-ray at a tube voltage of 30 to 60 kV. The fabrics with Ba/AC illustrated a greater X-ray shielding efficiency than the barium sulfate powder due to the amorphous cellulose surrounded barium sulfate particles play a role in distributing the particles throughout the material. The Ba/AC could be used as a substrate for X-ray shielding materials, with the benefits of environmental-friendly, non-toxic, cost-effective, and appropriate scaling up for commercial purposes.

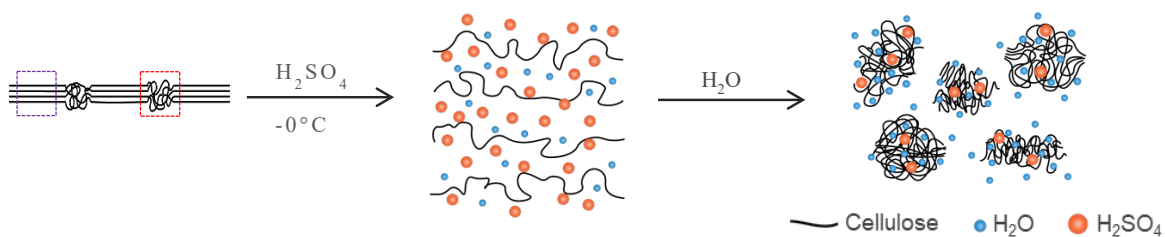


Fig.1. The fabrication process of amorphous cellulose.

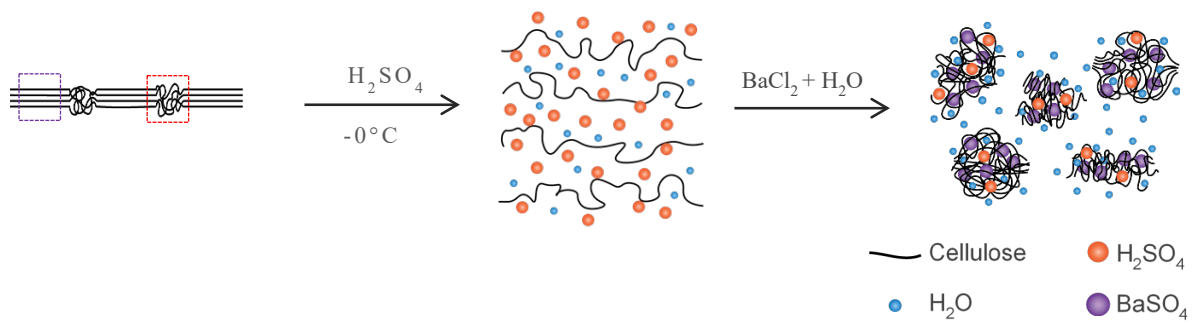


Fig.2. The fabrication process of Ba/AC-BaCl₂.

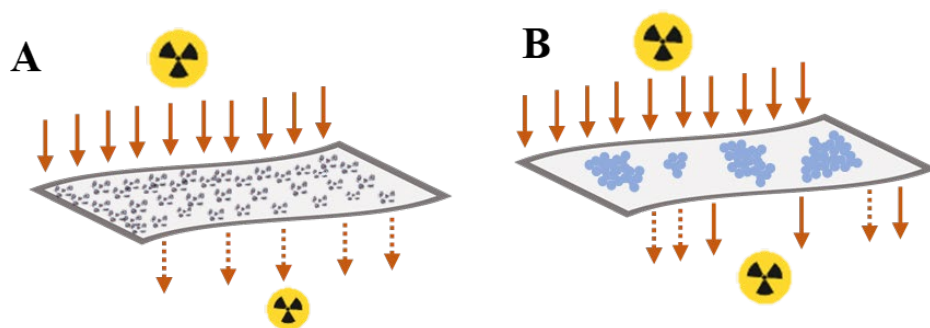


Fig.3. The distribution of barium sulfate particles affects X-ray transmittance.

(A) Ba/AC and (B) BaSO₄ powder.