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| **Published Researches**  **الأبحاث المنشورة** | |
| Title  **عنوان البحث** | Functionalization of aminoalkylsilane-grafted cotton for antibacterial, thermal, and wettability properties |
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| Abstract  **خلاصة** | * Multifunctional cotton fabrics are considered a significant challenge, hindering their commercialization through a scalable and eco-friendly method. The main drawbacks that limit their wide application are the lack of antibacterial activity, wettability, and being easily damaged by fire. Herein, we report a facile synthesis technique of superhydrophobic, flame resistant and antibacterial cotton fabric production using APTES agents to achieve all the above-mentioned properties. This study optimized the chemical grafting of aminoalkylsilane on the cotton surface with different reaction times and APTES concentrations to get the highest grafting content. Chemical characterization confirmed successful aminoalkylsilane grafting on the surface of cotton fabric. Subsequently, the antibacterial activity, wettability, and flame resistance properties of aminoalkylsilane grafted cotton fabric were accurately investigated. The obtained results showed that samples at 10 h reaction time with 14% APTES concentration indicated higher grafting content which showed high enhancement. Additionally, all produced aminoalkylsilane grafted cotton demonstrated a water contact angle of higher than 115° with low surface energy as well as impressive antibacterial activity. The obtained grafted cotton could be used as a promising filter screen for separating oils from contaminated water with more than 90% separation efficiency. This method is easy, environmentally friendly, cost-effective, and practical. It can be widely used to produce superhydrophobic cotton fabric on a large scale, which holds great potential in oil-water separation energy-saving clothing and healthcare products. |