

SYNTHESIS OF PHOSPHORUS CONTAINING FLAME RETARDANTS AND INVESTIGATION FLAME RETARDANT BEHAVIOUR ON THE TEXTILE APPLICATIONS

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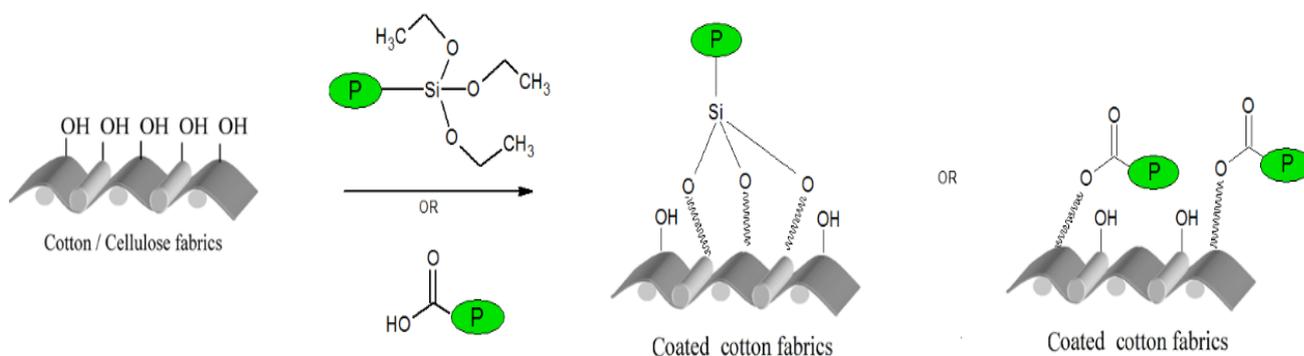
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Cotton fabrics have been one of the most widely used bio-based textiles all over the world. They have been widely applied in both civilian and military fields due to their excellent properties, such as hydrophilicity, airpermeability, softness and comfortableness and so on. However, the flammability showed their weakness and badly limited the production of high performance flame retardant textileproducts[1].

Many people constantly use halogen-free phosphorus compounds as flame retardants for cotton textiles. They are cheap to manufacture, are less volatile and toxic, have good thermal stability and promote char formation during the burning process. Some studies [2,3] have shown that, phosphorus-compounds can catalyze char formation and reduce the flammability of cotton textiles.

In this study, we have synthesized reactive phosphorus containing flame retardants that can be covalently attached to the textile surface. First reactive included phosphate and acid groups, and catalyzed cellulose to produce more residual char. What is more in second reactive, when cotton fibers coated with the product of APTES hydrolysis was on fire, it might form silicon dioxide. This formed residual char and silicon dioxide prevented cotton fabrics from further burning and resulted in the fire retardant improvement of coated cotton fabrics.

Thermal properties of the textile were investigated by TGA, UL94 and microcalorimetric studies.



Keywords: Flameretardancy, phosphorus, textile application

References:

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