

Small Molecules for the Preparation of Modified Aramid Fibers with Improved Properties

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Aramid fibers are a category of synthetic polyamides. Their exceptional mechanical properties and heat resistance have rendered them as the material of choice for use in ballistic vests, with notable commercial representatives such as Kevlar®.¹ Their use as body armor fabrics requires additional important properties, which are often neglected, regarding overall textile durability as well as end-user health and comfort.

PROTECT is a collaborative multidisciplinary research project targeting the synthesis and evaluation of innovative aramid-based fibers, modified with either small molecules or/and nanomaterials. The aim is the realization of durable fabrics with exceptional mechanical, as well as antibacterial,² heat/UV resistant,³ and water-repellent properties. In this presentation, we show the work regarding the design and synthesis of the small organic molecules to be used to this end, bearing functions for covalent attachment onto the aramid fiber, introducing the aforementioned properties in the textile. Additionally, the design and synthesis of a small-molecule chemical equivalent for the evaluation of the (covalent) derivatization of the aramid backbone is presented.

References:

1. X. Chen.; Y. Zhou, Handbook of Technical Textiles (Vol. 2), (2016), Woodhead Publishing, pp 169-192.
2. Y. Sun.; G. Sun, *J. Appl. Pol. Sci.* **2003**, 88, 1032.
3. M. C. Popescu et al. *Appl. Surf. Sci.* **2019**, 481, 1287.

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