One-dimensional carbon-based nanostructures via the droplet-assisted growth and shaping (DAGS) mechanism

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One-dimensional (1D) polymeric nanostructures e.g. nanofibers, nanotubes, and nanowires are nanomaterials with a typical diameter ranging from 1 to 100 nm which can be fabricated via several techniques including electrospinning, self-assembly, and template methods.[1-4] The droplet-assisted growth and shaping mechanism (DAGS) belongs to one of the approaches for the production of (1D) nanomaterials.[5] Conceptually similar to the VLS method, the DAGS mechanism uses water nanodroplets that have formed on the substrate surface to react with a precursor generating unidimensional polymeric nanostructures namely, based on silicone, alumina, and germanium oxide. [5-7] However, the DAGS mechanism has not been used to fabricate organic polymeric unidimensional nanomaterials. In this work, we demonstrate that the DAGS technique can also be applied to organic precursors such as ethyl cyanoacrylate to obtain (1D) nanostructures. This opens up new avenues for developing (1D) nanomaterials, which, for instance, could be exploited in superhydrophobic coatings, optoelectronics, and biomedical applications. [8-10]

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