

Synthesis of ureidopyrimidinone-functionalized polyethylene with improved mechanical properties via reactive extrusion

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Despite the extensive research on synthetic supramolecular polymers, polyolefins and in particular polyethylene (PE) remain mainly unexplored in this relatively new field of polymer chemistry due to the lack of functional groups. PE is the most widely used commodity thermoplastics due to its good solvent resistance, excellent flexibility, low cost and ease of processing. However, improved mechanical performance could extend its applications even further¹⁻². Ureidopyrimidinone (UPy) is a well-known self-complementary unit, strongly held together by the four hydrogen bonds arranged in a AADD array of donor and acceptor groups³. UPy-functionalized polyethylenes were successfully synthesized *via* reactive extrusion in one step, without the use of any solvents or catalysts. A formation of a supramolecular network was confirmed by parallel plate rheology and dynamical mechanical thermal analysis (DMTA) facilitating superior mechanical performance.

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