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Effect of crystalline organization on toughness.[1] LAURENT CORTE, Matiere Molle et Chimie, ESPCI-CNRS, LUDWIK LEIBLER, Matiere Molle et Chimie, ESPCI-CNRS — Impact resistance of semi-crystalline polymers can be greatly improved by the incorporation of rubber or inorganic particles. We report that the crystalline organization of the polymer matrix is a key-parameter for toughening. Cutting test bars into injected plates of toughened polyamide allows to study the impact behaviour of a same sample volume under various impact directions. When impact is applied perpendicularly to the injection direction, these systems exhibit a ductile behaviour while they become dramatically brittle when impact is parallel to it. More generally, the impact properties of these toughened systems depend strongly on thermo-mechanical history and processing conditions. We show by X-ray and TEM observations that this behaviour is to be correlated to the crystalline organization and propose a theoretical model that links toughness and crystalline organization.

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