Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Guiding the orientation of polymer crystals by nano-imprint lithography ZHIJUN HU, JEAN-FRANÇOIS GOHY, VINCENT BAYOT, ALAIN JONAS, Universite catholique de Louvain, CERMIN TEAM — Polymer crystallization is notoriously difficult to control at a local scale. Here, we report on a fast and easy method to guide the orientation of crystals of semicrystalline polymers at the nanometer scale by using nanoimprint lithography (1). Whenever a silicon mold bearing topographical nano-features (typical lateral size 50-250 nm; typical height 100 nm) is pressed against a molten film of a crystallizable polymer (poly(vinylidene fluoride was used here), the molten polymer is forced to flow into the cavities of the mold. The isolation of polymer in separate nano-cavities, which strongly decreases the importance of nucleation by impurities, the confinement of the polymer in nano-sized cavities, the probable partial orientation of chains near the vertical walls of the mold due to polymer flow, and interfacial effects, lead to a fine control over crystallographic orientation, crystal size and shape. This is shown for a series of geometries, from simple straight lines to more complex shapes such as concentric circles and small squares. References (1) Zhijun Hu et al., Nano Letters 2005, 5, 1738.

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Date submitted: 23 Nov 2005 Electronic form version 1.4