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A martensitic-like transition in a normal alkane JEFFREY HUTTER, SHAILESH NENE, ERIC KARHU[1], ROBERTA FLEMMING, The University of Western Ontario — The normal alkanes, C_nH_{2n+2}, with a structure consisting of a single chain, are the simplest hydrocarbons. These are an interesting class of material, both in terms of their intrinsic properties and the fact that many biological molecules contain hydrocarbon domains. Normal alkanes exhibit an unusual phase diagram with several solid phases, some of which—the "rotator phases"—are characterized by positional order without long-range orientational order. We have found a striking pattern of twinned, striped domains that occurs in thin layers the monoclinic rotator RV phase of tricosane ($C_{23}H_{48}$). We have studied this structure, and its transitions to other phases, by X-ray diffraction, as well as by optical and atomic-force microscopy. Intriguingly, transitions between the RV phase and the RI orthorhombic phase lying at higher temperatures appear to be diffusionless, and preserve molecular-scale features even after multiple transitions between the phases. These properties are reminiscent of martensitic transformations, which are better-known in metal alloys, but occur here at convenient temperatures and with slow kinetics.

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