

Abstract Submitted
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Low Temperature Flow of PVC Chains WEI CHEN, GI XUE¹ —

PVC is usually processed at temperature above 180 °C, however, it starts to degrade at 130 °C. If PVC can flow at temperatures below glass transition temperature (T_g), the manufacturing procedure will be energy-conserving and environment-friendly. We find that PVC powders with controlled inter-segment van der Waals attraction can be compressed into a transparent pellet with high modulus at low temperatures. The molecular mechanism underlying this phenomenon involves shear-induced unjamming transition. PVC chains are unjammed by cold-pressing freeze-dried powder with decreased packing density. Because the T_g of freeze-dried PVC is dramatically reduced to the test temperatures under compression, PVC chains are able to flow by applying pressure solely. These results help us better understanding glass transition and can possible to develop a theory for cold processes.

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