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The Role of Surface Charge of Nucleation Agents on the Crystallization Behavior of Poly(vinylidene fluoride) YING WU, SHAW LING HSU, University of Massachusetts, Amherst — The effect of the surface charge of nucleation agents on the crystallization behavior of poly(vinylidene fluoride) (PVDF) has been investigated. Ion-dipole interaction between the positive surface of nucleation agents and the partially negative CF2 dipoles of PVDF was considered as a main factor for further lowering free energy barrier for nucleation, and thus increasing significantly the crystallization kinetics. This is in contrast to the behavior observed for nucleation agents possessing either negative surface or neutral charges. Positive nucleation agents led to a remarkable increase in the crystallization temperature (lower supercooling), the melting point and degree of crystallinity of PVDF as compared with that of neat PVDF. The dispersion of each type of nucleation agents is also important. The melting temperature needs to be higher than the melting temperature of PVDF. The detailed crystallization behavior and its kinetics, including the conformational changes of the PVDF chain during the crystallization of neat PVDF and PVDF with specific nucleation agents, have also been investigated. With the addition of positive nucleation agents, the γ and β chain conformations, instead of the α phase, dominate.

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