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CRYSTALLINE POLYSTYRENE GRAFT COPOLYMERS AND THEIR PREPARATION

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Crystallizable, homogeneous graft copolymers of styrene are produced by contacting styrene with a catalytic mixture containing trialkyl aluminum wherein the alkyl groups are of 1 to 12 carbon atoms and vanadium trihalide, prior to any substantial reaction between said trialkyl aluminum and said vanadium trihalide, to form a reaction mixture containing a "living," solid polystyrene onto which α-monoolefinic hydrocarbons of up to 10 carbon atoms may be polymerized to form a graft copolymer. Polymerization of the styrene in the initial step can be conducted in the presence or absence of an inert diluent at a temperature of 0–250° C., preferably 60–250° C. and a pressure in a range of 0–1000 p.s.i.g. or greater, preferably 300–1000 p.s.i.g. The reaction time is ordinarily within the range of 0.5 to 5 hours. The preferred catalyst is a mixture of triethyl aluminum and vanadium trichloride. The graft copolymerization reaction can be carried out at temperatures similar to those employed for the pre-polymerization of the styrene. The preferred α-olefinic hydrocarbons graft-copolymerized onto the polystyrene are ethylene and propylene.