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[54] ULTRA-ORIENTED CRYSTALLINE FILAMENTS

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[22] Filed: Mar. 25, 1996

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Reissue of:

[64] Patent No.: 5,405,696  
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U.S. Applications:

[63] Continuation-in-part of Ser. No. 830,704, Feb. 4, 1992, Pat. No. 5,268,133, which is a continuation-in-part of Ser. No. 525,874, May 18, 1990, Pat. No. 5,149,480.

[51] Int. Cl.<sup>6</sup> ..... D02G 3/00; D02G 3/02

[52] U.S. Cl. .... 428/364; 428/395; 428/902; 428/243

[58] Field of Search ..... 428/364, 395; 57/902, 243

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[57] ABSTRACT

Ultra-oriented, crystalline synthetic filaments with high tenacity are produced by extrusion of a fiber-forming synthetic polymer melt into a liquid isothermal bath maintained at a temperature of at least 30° C. above the glass transition temperature of the polymer, withdrawing the filaments from the bath and then winding up the filaments. Polymer filaments so produced are characterized in that the ratio of the crystalline orientation factor ( $f_c$ ) to the amorphous orientation factor ( $f_a$ ) is 1.2 or less, and are further characterized in that the percent crystallinity is less than 40. The filaments also have a fine crystal size. The crystal size is less than 40 Å in the 100 and 105 planes and less than 30 Å in the 010 plane.

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25 Claims, 4 Drawing Sheets

