

United States Patent [19]

Randall et al.

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[54] POLYMER AND IRRADIATION
TREATMENT METHOD

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[56] References Cited

U.S. PATENT DOCUMENTS

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|-----------|---------|---------------|-------|-----------|
| 2,825,721 | 3/1958 | Hogan et al. | | 526/352 |
| 2,878,174 | 3/1959 | Rainer et al. | | 204/154 |
| 2,906,678 | 9/1959 | Lawton | | 204/154 |
| 3,146,146 | 8/1964 | Anderson | | 156/272 |
| 3,349,018 | 10/1967 | Potts | | 204/159.2 |
| 3,563,870 | 2/1971 | Tung et al. | | 204/159.2 |
| 4,288,584 | 9/1981 | Mishra | | 526/348.4 |
| 4,316,973 | 2/1982 | Kennedy | | 525/335 |

FOREIGN PATENT DOCUMENTS

638387 3/1962 Canada 204/159.2
0035674 11/1970 Japan 204/159.2

OTHER PUBLICATIONS

Bovey, The Effects of Ionizing Radiation on Natural
and Synthetic High Polymers, pp. 97-114 (1958).

Wild et al., Gel Permeation Chromatography of Poly-
ethylene, J. App. Polymer Sci., 21, 3331-3343 (1977).
Randall, Characterization of Long-Chain Branching in
Polyethylenes Using C-13 NMR, ACS Symposium
#142 (1980).

Mitsui, Radiation-Induced Cross-Linking of Polyethyl-
ene, Polymer Journal, 4, 79-86 (1983).

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[57]

ABSTRACT

A novel polymer and polymer treatment method are
provided. The method involves irradiation of a polymer
under non-gelling conditions at a temperature above the
polymer melting temperature and in the absence of
oxygen. The polymer is characterized by a unique long
chain Y-branched molecular structure.

45 Claims, 5 Drawing Figures

