US005202413A

United States Patent [19]

Spinu

[11] **Patent Number: 5,202,413**

[45] **Date of Patent: Apr. 13, 1993**

[54] **ALTERNATING (ABA)N POLYLACTIDE BLOCK COPOLYMERS**

[75] Inventor: **Maria Spinu**, Wilmington, Del.

[73] Assignee: **E. I. Du Pont de Nemours and Company**, Wilmington, Del.

[21] Appl. No.: **816,201**

[22] Filed: **Dec. 31, 1991**

[51] **Int. Cl.**[5] **C08G 63/08**

[52] **U.S. Cl.** **528/354**; 525/415; 528/26; 528/28; 528/76; 528/83; 528/300; 528/301; 528/341

[58] **Field of Search** 528/28, 26, 76, 83, 528/300, 301, 341, 354; 525/415

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,878,236	3/1959	Young et al. .	
3,169,945	2/1965	Hostettler et al. .	
4,328,322	5/1982	Baroni	528/68 X
4,699,974	10/1987	Evans	528/354
4,950,735	8/1990	Vanderbilt et al.	528/354
5,028,667	7/1991	McLain et al.	525/415

FOREIGN PATENT DOCUMENTS

5060290	1/1990	Australia .
3911557	8/1989	Fed. Rep. of Germany .
59-27923	2/1984	Japan .

OTHER PUBLICATIONS

Barskaya et al., "Polymer Science USSR," (translated from) vol. 25, No. 7, pp. 1788–1793 (1983).

Feng et al., "J. Polym. Sci: Letters Ed." vol. 21 pp. 593–600 (1983).

Song et al., "Macromolecules" vol. 17 pp. 2764–2767 (1984).

Grijpma et al., "Polymer Bulletin" vol. 25 pp. 327–333 (1991).

Hamitou et al., "J. Polym. Sci: Pol. Chem. Ed." vol. 15, pp. 1035–1041 (1977).

K. J. Ivin, T. Saegusa, "Ring Opening Polymerization" vol. 1, Ch. 7 pp. 461–521 (1984).

Primary Examiner—Nathan M. Nutter
Assistant Examiner—Shelley Wright
Attorney, Agent, or Firm—Robert B. Stevenson

[57] **ABSTRACT**

Polymers of the general formula R—(A-B-A-I)-$_x$A-B-A-R and their preparation are disclosed. In the general formula, -A- is a polyhydroxy acid residue preferably a polymer of either 98 to 100% L-lactide or 98 to 100% D-lactide having a molecular weight of 500 to 40,000 and preferably 2,000 to 20,000, -B- is an oligomeric diol or diamine residue, having a number average molecular weight of 500 to 20,000 and preferably 2,000 to 8,000. The polymers are prepared by polymerizing a lactone onto the diol or diamine followed by reacting the resulting polymeric H-A-B-A-H with an diisocyanate or diacyl chloride to form the -L- chain extending units in the general formula.

25 Claims, No Drawings