

[54] **COATING FOR BIOPROSTHETIC DEVICE AND METHOD OF MAKING SAME**

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[56] **References Cited**

U.S. PATENT DOCUMENTS

2,640,752	6/1953	Davis	8/94.11
2,938,892	5/1960	Sheehan	8/94.11
3,673,612	7/1972	Merril et al.	3/1
3,865,615	2/1975	Manly	3/1
3,908,201	9/1975	Jones et al.	3/1
3,966,401	6/1976	Hancock et al.	8/94.11
4,050,893	9/1977	Hancock et al.	8/94.11
4,077,069	3/1978	Perkins	3/1
4,082,507	4/1978	Sawyer	8/94.11
4,098,571	7/1978	Miyata et al.	8/94.11
4,120,649	10/1978	Schechter	3/1

FOREIGN PATENT DOCUMENTS

559701 7/1977 U.S.S.R. 3/1.4

OTHER PUBLICATIONS

Sawyer et al., *Artificial Organs*, vol. 1, No. 2, Nov. 1977.
 Ferrans et al., *The Amer. Jour. of Cardiology*, vol. 41, (1978), pp. 1159-1184.
 Broom et al., *Thorax*, vol. 34, (1979), pp. 166-176.

Larsson et al., *Thrombosis and Haemostasis*, vol. 37, No. 2, pp. 261-273 (1977).

Strawich et al., *Biomat., Med. Dev. Art. Org.*, vol. 3, No. 3 (1975) pp. 309-318.

Cohen et al., *Cardiovascular Surgery*, Supp. 3, Circulation, vol. 54, No. 6, (1976), pp. III-60-63.

McIntosh et al., *Surgery*, vol. 78, No. 6 (1975), pp. 768-775.

Zudie et al., *The Annals of Thoracic Surgery*, vol. 17, #5, pp. 479-491 (1975).

Mattila et al., *Annals Chirurgiae et Gyn. Fenniae*, vol. 62, pp. 234-239, 1973.

Broom, *J. Biomechanics*, vol. 10, pp. 707-724, 1977.

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[57] **ABSTRACT**

A coating and integral treatment for improving the biophysical stability of bioprosthetic devices after implantation, particularly with respect to calcification, and, specifically, a method for treating animal tissues, such as heart valves, to provide improved biophysical stability in allograft and heterograft transplantations. The increased stability results, in-part, from the creation of a three-dimensional matrix of a primary structural component of the prosthetic device and covalently attached calcification inhibitors. Other materials, some having additional stabilizing effects, may be utilized to form additional bridges or fill the interstitial gaps in the matrix. After implantation, the resultant modified device exhibits minimal surface for intramatrix growth of calcium phosphate crystals, and additionally, may inhibit platelet aggregation, enzymatic degradation and host rejection, while minimizing the risk of mechanical failure, in the host organism.

66 Claims, No Drawings