

[54] PHOSPHORIC ACID CRYSTALLIZATION PROCESS

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[56] References Cited

U.S. PATENT DOCUMENTS

1,283,398	10/1918	Carothers et al. .	
2,813,777	11/1957	Swensen .....	23/301 R
2,847,285	8/1958	Pahud .	
2,857,246	10/1958	Malowan .	
3,284,171	11/1966	Harper .	
3,333,929	8/1967	Mazurek et al. .	
3,642,439	2/1972	Moore et al. .	
3,679,374	7/1972	Kovacs .	
3,853,486	12/1974	Heymer et al. .	
3,890,097	6/1975	Minor .	
3,912,803	10/1975	Williams et al. .	
3,947,499	3/1976	Edwards et al. .	
4,083,934	4/1978	Lowe et al. .	
4,215,098	7/1980	Lowe et al. .	
4,243,643	1/1981	Mills .	
4,278,648	7/1981	Walton .	
4,296,082	10/1981	Lowe et al. .	
4,299,804	11/1981	Parks et al. .	
4,332,592	6/1982	Müller .....	23/301 R
4,487,750	12/1984	Astley et al. ....	423/321 R

FOREIGN PATENT DOCUMENTS

14692	6/1969	Japan .	
1436115	5/1976	United Kingdom .	
2078694	1/1982	United Kingdom .....	423/321 R

OTHER PUBLICATIONS

W. Ross et al, The Purification of Phosphoric Acid by Crystallization, Industrial and Engineering Chemistry, Oct. 1925, pp. 1081-1083.

C. Y. Shen, Production of Crystalline Pyrophosphoric Acid and Its Salts, Industrial & Engineering Chemistry, Process Design and Development, vol. 14, No. 1, pp. 80-85, Jan. 1975.

N. J. J. Huige et al., Production of Large Crystals by Continuous Ripening in a Stirrer Tank, Journal of Crystal Growth, 13/14, May 1972, pp. 483-487.

E. J. Lowe—"Purification of Wet-Process Phosphoric Acid".

R. F. Johnson—"Phosphoric Acid", vol. 1, Part II, published by Marcel Dekker—1968.

Conf. Proceeding in Japan on "Purification of Phosphoric Acid Hemihydrate by Crystallization", Yoshi Aoyama, et al.—1976.

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[57] ABSTRACT

The present invention discloses a new method for obtaining a crystallized phosphoric acid of relatively high purity starting with conventional phosphoric acid. The new method is based on crystallization of orthophosphoric acid hemihydrate from the phosphoric acid. Massive nucleation which would lead to the formation of unprocessable masses is avoided in the new method by providing unusually large amounts of fine relatively pure seed crystals of orthophosphoric acid hemihydrate and operating the crystallization process under conditions which favor crystal growth on the seed crystals and disfavor the occurrence of secondary nucleation. To prevent the crystallizing magma from reaching a viscosity which would render further processing difficult the present invention provides for recycling raffinate in an amount sufficient to maintain the solids content of the crystallizing magma below about 40%.

15 Claims, 1 Drawing Figure

