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(54) Title: TRI-CATION ZINC PHOSPHATE CONVERSION COATING AND PROCESS OF MAKING THE SAME

(57) Abstract: Tri-cation zinc phosphate conversion coating compositions are disclosed. The compositions include a phosphate component, ions of nickel, manganese, and zinc, and a glycerophosphate component, such as disodium glycerophosphate. Coatings formed from these compositions provide improved corrosion resistance to metal substrates and provide a uniform layer for the application of paint finishes. Processes of making and using these compositions are also disclosed.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 403 241 A (NIPPON PAINT CO LTD) 19 December 1990 (1990-12-19) claims 1-4	1, 12, 14-18, 27, 37, 41, 42
A	FR 1 344 776 A (AMCHEM PROD) 29 November 1963 (1963-11-29) page 1, right-hand column; claims I, II	1, 2, 4, 7-12, 27-34, 41
A	GB 1 570 041 A (UNION CARBIDE AGRICULT) 25 June 1980 (1980-06-25) claims 1-6; table 7	1, 12-18, 27, 41
A	EP 0 084 593 A (PENNWALT CORP) 3 August 1983 (1983-08-03) page 4, paragraph 3; claims 1, 2, 11	1, 27, 41
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Patent family members are listed in annex.

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PCT/US 01/26803

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1 510 277 A (WOODS K) 10 May 1978 (1978-05-10) claims 1,2 ----	1,27,41
A	FR 1 555 387 A (COLLARDIN GERHARD) 24 January 1969 (1969-01-24) page 3, left-hand column, paragraph 10; claims 1,2 ----	1,2,27, 41
A	US 4 957 568 A (ENDRES HELMUT ET AL) 18 September 1990 (1990-09-18) cited in the application ----	
A	US 5 238 506 A (CAPE THOMAS W ET AL) 24 August 1993 (1993-08-24) cited in the application -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/26803

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0403241	A	19-12-1990	JP 1963849 C	25-08-1995
			JP 3020476 A	29-01-1991
			JP 6096773 B	30-11-1994
			DE 69012665 D1	27-10-1994
			DE 69012665 T2	04-05-1995
			EP 0403241 A1	19-12-1990
			US 5221370 A	22-06-1993
FR 1344776	A	29-11-1963	US 3109757 A	05-11-1963
			BE 627337 A	
			DE 1243945 B	06-07-1967
			GB 957379 A	06-05-1964
			NL 120662 C	
			NL 288062 A	
GB 1570041	A	25-06-1980	AU 499368 B2	12-04-1979
			AU 2394477 A	12-10-1978
			BE 853269 A1	01-08-1977
			BR 7702121 A	08-02-1978
			CA 1098253 A1	31-03-1981
			CS 196209 B2	31-03-1980
			DE 2715292 A1	13-10-1977
			DK 148277 A	06-10-1977
			ES 457569 A1	16-03-1978
			FR 2347459 A1	04-11-1977
			HU 176364 B	28-02-1981
			IT 1143804 B	22-10-1986
			JP 1088523 C	23-03-1982
			JP 52131937 A	05-11-1977
			JP 56033468 B	04-08-1981
			MX 145560 A	08-03-1982
			NL 7703702 A ,B,	07-10-1977
			NO 771180 A ,B,	06-10-1977
			NZ 183742 A	26-04-1979
			PL 197203 A1	16-01-1978
			SE 441190 B	16-09-1985
			SE 7703909 A	06-10-1977
			US 4148670 A	10-04-1979
EP 0084593	A	03-08-1983	US 4427459 A	24-01-1984
			AU 551642 B2	08-05-1986
			AU 8807382 A	04-08-1983
			BR 8206256 A	20-09-1983
			CA 1197760 A1	10-12-1985
			DE 3278406 D1	01-06-1988
			DK 25883 A	26-07-1983
			EP 0084593 A1	03-08-1983
			EP 0244570 A1	11-11-1987
			JP 58133380 A	09-08-1983
GB 1510277	A	10-05-1978	AU 1649776 A	09-02-1978
			US 4086103 A	25-04-1978
FR 1555387	A	24-01-1969	DE 1621434 A1	03-06-1971
			ES 351450 A1	01-07-1969
			GB 1214674 A	02-12-1970
			SE 326088 B	13-07-1970
			US 3681148 A	01-08-1972

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/26803

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4957568	A	18-09-1990	DE 3814287 A1 09-11-1989
			AU 610386 B2 16-05-1991
			AU 3378589 A 02-11-1989
			BR 8902021 A 05-12-1989
			DE 58906393 D1 27-01-1994
			EP 0339452 A2 02-11-1989
			JP 1317108 A 21-12-1989
US 5238506	A	24-08-1993	US 4941930 A 17-07-1990
			US 4793867 A 27-12-1988
			CA 2035048 A1 27-07-1991
			EP 0439377 A1 31-07-1991
			JP 5025652 A 02-02-1993
			BR 8704942 A 17-05-1988
			CA 1321532 A1 24-08-1993
			DE 3751666 D1 15-02-1996
			DE 3751666 T2 05-09-1996
			DE 3789746 D1 09-06-1994
			DE 3789746 T2 01-12-1994
			EP 0261597 A2 30-03-1988
			EP 0448130 A1 25-09-1991
			ES 2056053 T3 01-10-1994
			ES 2084054 T3 01-05-1996
			JP 63166976 A 11-07-1988
			KR 9103722 B1 08-06-1991
			MX 170156 B 10-08-1993