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(54) **RESIN-COATED ALUMINUM ALLOY SHEET AND FORMED BODY USING RESIN-COATED ALUMINUM ALLOY SHEET**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,148,670	A	4/1979	Kelly	
4,273,592	A *	6/1981	Kelly	428/472.2
4,659,395	A *	4/1987	Sugama et al.	428/336
4,889,718	A *	12/1989	Sugama	428/343
5,174,816	A *	12/1992	Aoyama et al.	106/217.6
2005/0163933	A1 *	7/2005	Dietsche et al.	427/384
2009/0220714	A1 *	9/2009	Nishida et al.	428/35.7

FOREIGN PATENT DOCUMENTS

EP	1 932 944	A1	6/2008
JP	56-033468	B	9/1982
JP	5-125555	A	11/1991
JP	09-111465	A	4/1997
JP	2000160353	a	6/2000
JP	2001348535	*	12/2001
JP	2002-275648	A	9/2002
JP	2004183015	A	7/2004
WO	2004074372	A1	9/2004
WO	WO 2007/029755	*	3/2007
WO	2008149786		12/2008

OTHER PUBLICATIONS

English machine translation of JP 2001348535.*

Written Opinion of the International Searching Authority Form PCT/ISA/237 issued in PCT/JP2008/059977 on Dec. 1, 2009 (9 pages).

* cited by examiner

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(57) **ABSTRACT**

A resin-coated aluminum alloy sheet which has a chromium-free surface treatment layer and has a coating film formed by applying an organic resin, and which exhibits excellent adhesiveness and excellent corrosion resistance even after being subject to severe forming such as drawing is provided. A resin-coated aluminum alloy sheet includes: an aluminum substrate having a surface treatment film on at least one surface thereof; and an organic resin film layer formed on the surface of the aluminum substrate. The surface treatment film includes 2 mg/m^2 to 100 mg/m^2 of zirconium in terms of metal atoms and at least any one of a polyitaconic acid, monosaccharide alcohol and disaccharide alcohol as an aluminum-ion-trapping agent.

16 Claims, No Drawings