



US007984788B2

(12) **United States Patent**  
**Seo**

(10) **Patent No.:** **US 7,984,788 B2**  
(45) **Date of Patent:** **Jul. 26, 2011**

(54) **LAMINATED ACOUSTIC ABSORPTION  
SHEET WITH FLAME RETARDANT**

(75) Inventor: **Duckcheol Seo**, Cheonan-si (KR)

(73) Assignee: **Huneco Co., Ltd.**, Pyeongtaek-si (KR)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/516,707**

(22) PCT Filed: **Nov. 27, 2007**

(86) PCT No.: **PCT/KR2007/006039**

§ 371 (c)(1),

(2), (4) Date: **Dec. 17, 2009**

(87) PCT Pub. No.: **WO2008/066314**

PCT Pub. Date: **Jun. 5, 2008**

(65) **Prior Publication Data**

US 2010/0108439 A1 May 6, 2010

(30) **Foreign Application Priority Data**

Nov. 29, 2006 (KR) ..... 10-2006-0119379

(51) **Int. Cl.**

**E04B 1/84** (2006.01)

**E04B 1/82** (2006.01)

**E04B 1/88** (2006.01)

**B32B 7/08** (2006.01)

**E04B 1/74** (2006.01)

**B32B 7/00** (2006.01)

(52) **U.S. Cl.** ..... **181/294**; 181/290; 181/286; 156/93

(58) **Field of Classification Search** ..... 181/294,  
181/290, 296, 286, 284; 156/93

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,088,620	A *	5/1978	Nihongi et al. ....	524/503
4,726,987	A *	2/1988	Trask et al. ....	442/373
4,892,769	A *	1/1990	Perdelwitz et al. ....	428/68
5,225,140	A *	7/1993	Hayashikoshi et al. ....	264/571
6,042,765	A *	3/2000	Sugahara et al. ....	264/46.1
6,383,623	B1 *	5/2002	Erb, Jr. ....	428/299.7
6,905,987	B2 *	6/2005	Noda et al. ....	442/364
7,479,313	B2 *	1/2009	Chang et al. ....	428/31
7,491,770	B2 *	2/2009	Autran et al. ....	525/191
7,694,779	B2 *	4/2010	Takayasu et al. ....	181/294
2003/0134556	A1 *	7/2003	Christie et al. ....	442/327
2005/0212166	A1 *	9/2005	Seo et al. ....	264/147
2007/0190876	A1 *	8/2007	Ogawa et al. ....	442/136
2009/0258559	A1 *	10/2009	Anantharamaiah et al. ..	442/334

**FOREIGN PATENT DOCUMENTS**

JP	11180224	A *	7/1999
KR	2004060090	A *	7/2004
KR	2005027598	A *	3/2005
KR	2006032571	A *	4/2006

\* cited by examiner

*Primary Examiner* — Edgardo San Martin

(74) *Attorney, Agent, or Firm* — Rothwell, Figg, Ernst &  
Manbeck, P.C.

(57) **ABSTRACT**

The present invention relates to a light laminated acoustic absorption sheet. The light laminated acoustic absorption sheet with flame retardant is characterized in that one or more thermoplastic fibers (a) having a low melting point and selected from polyethylene, polypropylene, polyvinyl chloride, polyester, polyethylene-polyester copolymers, and one or more polyester interlaced-textured yarns or thermoplastic hollow fibers (b) having a higher melting point than the thermoplastic fiber (a) and selected from polyester, polyethylene, nylon, hot-melttable fluororesin are mixed and opened so as to prepare a mat, and two or more sheets of mats are laminated by using an apparatus of manufacturing a stampable sheet so as to manufacture the laminated sheet, and then the laminated sheet is impregnated with flame retardant liquid.

**6 Claims, No Drawings**