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Na et al.

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(54) **THIN FILM DEPOSITION APPARATUS**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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4,613,306 A *	9/1986	Bauer et al.	432/264
4,828,872 A *	5/1989	Bauer et al.	427/566
5,951,769 A *	9/1999	Barnard et al.	118/718
2005/0016463 A1 *	1/2005	Hirano	118/726

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FOREIGN PATENT DOCUMENTS

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KR	20-0379129 Y1	3/2005
KR	10-2006-0086511 A	8/2006

* cited by examiner

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See application file for complete search history.

(57) **ABSTRACT**

A thin film deposition apparatus includes a vacuum chamber, a substrate supporter disposed in the vacuum chamber to support a target substrate on which a thin film is deposited, and a deposition source that evaporates a deposition material and supplies the evaporated deposition material to the target substrate. The deposition source includes a crucible that includes a deposition material-containing portion to accommodate the deposition material and a first flange at an upper end of the deposition material-containing portion, a spray nozzle that includes a spray portion through which the evaporated deposition material is sprayed and a second flange at a lower end of the spray portion to make contact with the first flange, and a cooling member attached to an outer surface of the first flange and the second flange.

9 Claims, 7 Drawing Sheets

