



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C30B 15/14, 15/26, 29/06	A1	(11) International Publication Number: WO 99/16939 (43) International Publication Date: 8 April 1999 (08.04.99)
(21) International Application Number: PCT/US98/19919 (22) International Filing Date: 24 September 1998 (24.09.98) (30) Priority Data: 08/940,166 30 September 1997 (30.09.97) US (71) Applicant: MEMC ELECTRONIC MATERIALS, INC. [US/US]; 501 Pearl Drive, P.O. Box 8, St. Peters, MO 63376 (US). (72) Inventors: LUTER, William, L.; 1037 Picardy Lane, St. Charles, MO 63301 (US). FERRY, Lee, W.; 32 Autumn Wood Court, St. Charles, MO 63303 (US). (74) Agents: HEJLEK, Edward, J. et al.; Senniger, Powers, Leavitt & Roedel, 16th floor, One Metropolitan Square, St. Louis, MO 63102 (US).		(81) Designated States: CN, JP, KR, SG, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: HEAT SHIELD FOR CRYSTAL PULLER (57) Abstract A heat shield for use in a crystal puller around a monocrystalline ingot grown out of a crucible in the crystal puller filled with molten semiconductor source material. The heat shield includes a reflector having a central opening sized and shaped for surrounding the ingot as the ingot is grown to reduce heat transfer from the crucible. The reflector is adapted to be supported in the crystal puller between the molten material and a camera aimed toward at three separate points on a meniscus formed between the ingot and an upper surface of the molten material. The reflector has at least three passages extending through the reflector. Each of the passages is located along an imaginary line extending between the camera and one of the points on the meniscus. This permits the camera to view the points so the positions of the points can be determined by the camera for calculating the diameter of the ingot while minimizing heat loss through the passages.		