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(71) Applicant: MEMC ELECTRONIC MATERIALS, INC. [US/US]; 501 Pearl Drive, P.O. Box 8, St. Peters, MO 63376 (US).

(72) Inventors: KIM, Kyong-Min; 1199 Whitmoor Drive, St. Charles, MO 63304 (US). LUTER, William, L.; 1037 Picardy Lane, St. Charles, MO 63301 (US). FERRY, Lee, W.; 32 Autumn Wood Court, St. Charles, MO 63303 (US). BRAUN, Robert, J.; 240 Blanc-Lee, Belleville, IL 62226 (US). ILIC, Srdjan; Via Duca d'Aosta, 79, I-39100 Bolzano (IT). DIODA, Mauro; Via Roma, 106, I-39100 Bolzano (IT). TOSI, Paolo; Via Garibaldi, 33, I-39100 Merano (IT). GOBBO, Marco; Via Virgilio, 53, I-39100 Merano (IT). MARTINI, Umberto; B. Toti, 63, I-39100 Merano (IT).

(74) Agents: HEJLEK, Edward, J. et al.; Senniger, Powers, Leavitt & Roedel, 16th floor, One Metropolitan Square, St. Louis, MO 63102 (US).

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(54) Title: HEAT SHIELD ASSEMBLY AND METHOD OF GROWING VACANCY RICH SINGLE CRYSTAL SILICON

(57) Abstract

A heat shield assembly is used in a Czochralski crystal puller for selectively shielding a monocrystalline ingot of semiconductor material to control the type and number density of agglomerated defects in the crystal structure of the ingot. The heat shield assembly has an upper heat shield connected to a lower heat shield. The upper and lower heat shields are connected to each other and slidingly connected to an intermediate heat shield. The lower heat shield is able to telescope up into the intermediate heat shield to minimize the profile of the heat shield assembly located within a crystal growth chamber of the crystal puller. However when needed to control formation of the monocrystalline ingot, the lower heat shield may be extended from the intermediate heat shield and project downwardly into the crystal puller crucible in close proximity to an upper surface of molten semiconductor source material in the crucible. A method employing the heat shield assembly is also disclosed.