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(71) Applicant (for all designated States except US): UNIVERSITE DE SHERBROOKE [CA/CA]; University Boulevard, Sherbrooke, Quebec J1K 2R1 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): BEAUVAIS, Jacques [CA/CA]; 1961 Albert Skinner, Sherbrooke, Quebec J1J 1X3 (CA). DROUIN, Dominique [CA/CA]; 290 Pariseau, Deauville, Quebec J1N 3N9 (CA). LAVALLEE, Eric [CA/CA]; 2000 Le Montagnais, Apartment 401, Sherbrooke, Quebec J1K 2X9 (CA).

(74) Agents: DUBUC, Jean, H. et al.; Goudreau Gage Dubuc & Martineau Walker, The Stock Exchange Tower, Suite 3400, 800 Place Victoria, P.O. Box 242, Montreal, Quebec H4Z 1B9 (CA).

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(54) Title: FABRICATION OF SUB-MICRON ETCH-RESISTANT METAL/SEMICONDUCTOR STRUCTURES USING RESIST-LESS ELECTRON BEAM LITHOGRAPHY

(57) Abstract

To fabricate a mask for X-ray and/or ultraviolet lithography, a layer opaque to X-ray and/or ultraviolet radiation is first deposited on a substrate transparent to such radiation or reflective to ultraviolet radiation. Two superposed layers are then deposited on the opaque layer, a layer of silicon and a layer of metal. A focused electron beam is then applied to and displaced on the superposed layers to locally heat the metal and the silicon and cause diffusion of metal and silicon in each other to form a structure of etch-resistant metal silicide. The layers of metal and silicon are etched to leave on the substrate only the structure of etch-resistant metal silicide and the layer opaque to X-ray and/or ultraviolet radiation underneath this structure to form the mask for X-ray and/or ultraviolet lithography. A similar process is used to fabricate molds for nanimprint lithography.

