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(54) **INFLUENCE OF SURFACE GEOMETRY ON METAL PROPERTIES**

(75) Inventors: **Avto Tavkhelidze**, Tbilisi, GA (US);  
**Stuart Harbron**, Berkhamstead (GB)

(73) Assignee: **Borealis Technical Limited**, Gibraltar

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*H01L 29/06* (2006.01)  
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(52) **U.S. Cl.** ..... **257/10; 438/20; 257/E29.112**

(58) **Field of Classification Search** ..... **257/10; 438/20**

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

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*Primary Examiner*—Evan Pert

(57) **ABSTRACT**

The influence of surface geometry on metal properties is studied within the limit of the quantum theory of free electrons. It is shown that a metal surface can be modified with patterned indents to increase the Fermi energy level inside the metal, leading to decrease in electron work function. This effect would exist in any quantum system comprising fermions inside a potential energy box. Also disclosed is a method for making nanostructured surfaces having perpendicular features with sharp edges.

**24 Claims, 8 Drawing Sheets**

