

Title (en)  
SYSTEMS AND METHODS FOR MODIFYING ICE ADHESION STRENGTH

Title (de)  
SYSTEM UND VERFAHREN ZUM ÄNDERN DER STÄRKE VON EIS

Title (fr)  
SYSTEMES ET PROCEDES DE MODIFICATION DE LA FORCE D'ADHERENCE DE LA GLACE

Publication  
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Application  
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Abstract (en)  
[origin: WO9857851A2] The invention includes system for modifying ice adhesion strength of ice adhered to an object. The system includes an electrode that is electrically insulated from the object and a DC source, e.g., a battery, coupled to the object and the electrode. The source generates a DC bias to an interface between the ice and the object when the ice completes the circuit. The object is conductive or is doped as a semiconductor so that the DC bias applies a voltage to the interface which modifies the ice adhesion strength selectively as compared to the ice adhesion strength with substantially zero bias voltage at the interface. The strength can be increased or decreased relative to its static state (i.e., the state without applied voltage). In this manner, ice such as ice on an aircraft wing can be removed with less work. The system preferably includes an electrically insulating material disposed between the object and the electrode; the insulating material is substantially conformal to the object and the electrode. In most applications, the electrode includes a grid electrode shaped to conform to a surface of the object and each point of the grid electrode is in electrical contact with the source. Accordingly, a grid insulator is generally disposed between the object and the grid electrode. The invention has high applicability to objects such as an aircraft wing, an automobile windshield, a bottom of a ski, a heel or sole of a boot or shoe, and an outer material of a power line. The invention also includes a ferroelectric, ferromagnetic or semiconductor coating applied to power lines to autoregulate the temperature of the lines to just above the melting point.

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