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(54) **OXIDATION CERAMIC TO METAL BRAZE SEALS FOR APPLICATIONS IN HIGH TEMPERATURE ELECTROCHEMICAL DEVICES AND METHOD OF MAKING**

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(52) **U.S. Cl.** ..... **228/122.1; 228/248.1**

(58) **Field of Classification Search** ..... **228/122.1, 228/123.1, 124.1, 124.5, 124.6, 245-262**  
See application file for complete search history.

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(57) **ABSTRACT**

A method of joining metal and ceramic parts, wherein an alumina forming metal part and a ceramic part are provided. A braze material is placed between the alumina forming metal part and the ceramic part, and the combination is then heated in an oxidizing atmosphere, preferably in air at a temperature of between 500° C. and 1300° C. The alumina forming metal parts are selected from the group consisting of high temperature stainless steels, such as Durafoil (alpha-4), Fecralloy, Alumina-coated 430 stainless steel and Crofer-22APU, and high temperature superalloys such as Haynes 214, Nicrofer 6025, and Ducraloy. The braze material is selected as a metal oxide-noble metal mixture, preferably Ag—CuO, Ag—V<sub>2</sub>O<sub>5</sub>, and Pt—Nb<sub>2</sub>O<sub>5</sub>, and more preferably between 30.65 to 100 mole % Ag in CuO.

**20 Claims, 9 Drawing Sheets**

