Anode for Molten Salt Electrolysis

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Cited US Patents:

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US 4155758	197905	075232	Evans
US 4204863	198005	075234	Schreiner

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Abstract:
An electrode for an electrochemical cell comprising a variable cermet composition, the portion in contact with the electrolyte having a relatively high ceramic content for maximum corrosion resistance and the portion attached to the external electrical circuit having a relatively high metal content to facilitate an electrical connection. Preferred metals are Ni, Cu, Fe, and Cr; and preferred ceramics are ferrites.

We claim:

1. A permanent cermet anode for use in a Hall-Heroult cell having one end attached to a current source and the other end in contact with the molten electrolyte, the improvement comprising said ends having different compositions, the end attached to the current source by a brazed connection having from 30% to 60% by volume of a metal selected from the group consisting of Cu, Ni, Fe, Cr and alloys or mixtures thereof and from 40% to 70% by volume of a ceramic component, the end in contact with the electrolyte having from 75% to 84% by volume ceramic component and from 16% to 25% by volume of a metal selected from said group of metals, said end attached to said current source having a resistivity less than 1X10[sup]-3 ohm-cm at 950[degree(s)] C., and said end in contact with said electrolyte having a resistivity less than 1X10[sup]-1 ohm-cm at 950[degree(s)] C. with a negative temperature coefficient of resistivity. (Main Claim)
2. The anode of claim 1 wherein the electrolysis-adapted portion consists of at least 75% by volume of a ceramic phase and wherein said brazable portion consists of 30% to 40% by volume metallic phase.
3. The anode of claim 1 comprises of layers having 16, 22, 28, 34 and 40% by volume Ni powder and wherein the ceramic component is a MnZn ferrite.
4. The anode of claim 1 brazed to a current source at the brazable cermet end of said anode as an integral part of and concurrently with the sintering operation producing said anode.