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# A NOVEL CELL FOR THE ENERGY EFFICIENT ELECTROLYTIC PRODUCTION OF FLUORINE

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Many of the reasons for the poor energy efficiency of electrolytic fluorine production have been known for many years. Paramount among these are high anodic overpotential; high ohmic losses and low current efficiency stemming from recombination of fluorine and hydrogen. Reducing the intrinsic anodic overpotential will be difficult at best but the other energy losses are extrinsic to the chemical process and therefore amenable to reduction through creative mechanical design. The development, design and operational characteristics of a novel cell for fluorine production will be described. Fluorine production may be carried out at high current densities in a cell having a small anode-cathode gap and a greatly increased anode and cathode length and which functions without the evolution of fluorine as free bubbles at the vertical carbon surface of the anode assembly facing the cathode and without formation of explosive mixtures of hydrogen and fluorine. The cell anode can be a cylindrical stack of carbon plates provided with grooves and passages and fitted to a central conductor. The anode has the capability of removing gaseous fluorine internally, thus minimizing blinding of anode surface by adherent fluorine. A louvered cathode permits most of the hydrogen to be vented away from the interelectrode gap thus reducing ohmic voltage loss and hydrogen-fluorine recombination. Combination of the segmented anode design with a louvered cathode provides a unique cell for fluorine production because virtually the same electrolysis conditions exist at any part of the anode and cathode. Commercialization of such a cell could result in significant manufacturing cost reductions due to energy savings and reduced capital investment.