

Oxygen pumping characteristics of Cu-Ti double substituted bismuth vanadate.

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In the present paper, we are going to report on a detailed study of the characteristics of an electrochemical oxygen pump for an open system using Cu-Ti double substituted bismuth vanadate as the electrolyte. The major objectives are to show a correlation between oxygen pumping current, cell voltage, Faradic efficiency and oxygen production rate. The maximum current density that can be applied without significant structural modification has been determined and the effect of working temperature on the mentioned parameters have been investigated.

The results show that, there is an Ohmic relationship between current and voltage at low current densities and a deviation towards lower voltages than expected from Ohm's law with increasing current density. The oxygen production rate increased in a linear fashion by increasing the current density while at high current densities, corresponding to the non- linear current voltage section, its gradient decline. Under constant current load, at very high current density ($I \approx 800 \text{ mAcm}^{-2}$), instability in cell potential was observed, which was reversible and supposed to be the effect of electronic percolation.