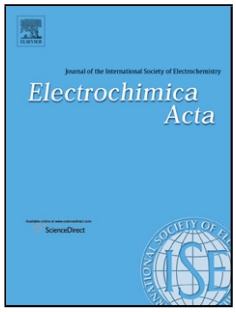

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Electrochemical production of colloidal sulphur by oxidation of sulphide ion at lead coated-2- and -3-dimensional rotating cylinder anode surfaces

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Research highlights

- ▶ Lead was identified as an appropriate anode material for sulphide oxidation
- ▶ Colloidal sulphur was produced by electrochemical oxidation of hydrogen sulphide
- ▶ A three-dimensional anode can operate effectively in a biphasic system

ABSTRACT

An electrochemical reactor with a rotating cylinder electrode is analysed for the production of colloidal sulphur by oxidation of sulphide ions with a concentration of 2 g dm^{-3} in alkaline solutions at 80 °C. The anode, coated with lead, was either a smooth cylinder or a three-dimensional one. The formation of polysulphides takes place in a wide range of potential of 0 to 1.2 V, against saturated calomel electrode (SCE), at a constant current density, which is independent on the rotation speed for values higher than 100 rpm. For the smooth anode the space time yield was 0.4 kg m^{-3} h^{-1}. However, this parameter was increased 5 times in the potential range of 0.8 V to 1.2 V, vs. SCE, by using a three-dimensional structure with a bed depth of 8 mm. The specific energy consumption was 11.7 kW h kg^{-1} with a current efficiency near 100%. When the sulphide ions were replenished by dissolution of hydrogen sulphide from a gas

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