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Synthesis of Substance and Generation of Heat in Charcoal Cathode in electrolysis of H2O and D2O Using Various Alkalihydrooxides

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Abstract

Charcoal was used for the cathode with interest in the fabricated micro-channels which may produce the microdrops responsible for the synthesis of material and C.F.in the electrolysis as reported in the previous proceeding.

The synthesis of material was detected with the change in color of the electrolite,from colorless to dark brown. The excess heat was not detected for H2O. However,for a mixture of 25%H2O and 75%D2O with 0.25NLiOH,the excess heat reached as high as about 30% of the input power.

1.Introduction

It is well known that charcoal has micro-channels built in biologically,and that it has high electrical conductivity when prepared at high temperatures. So it is of interest whether the cathodic use of charcoal may perform the working of the microdrop,the synthesis of material and the evolution of heat,as shown previously(1).

2.Charcoal Cathode

The specimen was sampled from the twig charcoal by sawing cross sectionally for various lots,forms and sizes.The ash elements were removed by immersing the specimen into HCl for about three days and the acid was removed by washing in hot water.The electrode applied was a piece of solder wire, Pb-Sn alloy,pushed into a drilled hole.The side surface of the specimen was coated with Araldite resin to maintain the mechanical strength and to diminish the waste current which does not take part in the electrolysis in the micro-channel.

3.Synthesis of Substance in Charcoal Cathode

The specimen was dipped partially into an electrolyte

containing 0.25N of an Alkalihydrooxide,i.e.LiOH,NaOH,KOH, RbOH and CsOH respectively.The electrolysis was done in a cell containing 50-80cc of the electrolyte under the input power less than about 4 watt.

From the early stage of the experiment for NaOH,it was found that the electrolyte used was often colored with dark brown in about half an hour.As there was no substance responsible for the colorization other than charcoal,Araldite was not yet used at that time,it was supposed that some materials are created in the cathode.To assure this idea a heating experiment was done for the sliced and powdered charcoal respectively in 0.25N NaOH-water solution at about 90 °C for 4 hours. As a result the former produced slight colorization of dark brown,but the latter did not at all. This shows that the colorization is due to the structure-dependent synthesis action in the charcoal and not due to the extraction of substance from the charcoal. In this way the synthesis action of the microdrop was assured and the colorization became a compass needle for the xperiment.

4.Generation of Heat in Cathode

The working microdrop evolves heat as a parallel phenomenon to the synthesis.The temperature rise in the cathode was measured by using two sets of thermistor thermometers as shown in Fig.1.The temperature rise ΔT is given by,

$$\Delta T = Tc - Tw, \tag{1}$$

where Tc and Tw show the temperatures in the cathode and the electrolyte respectively.By applying a constant DC voltage

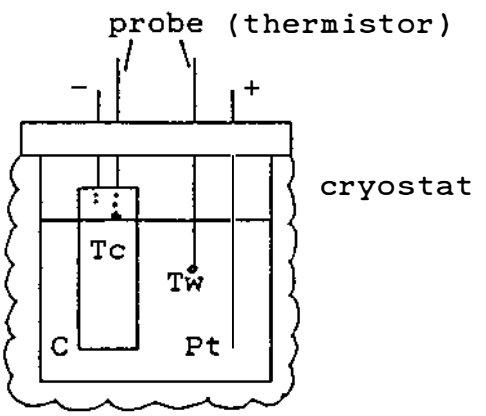

Fig.1 Arrangement for measuring temperature rise in cathode by electrolysis.

Tc and Tw were measured as functions of time,and it was found that the colorization is strongly correlated with ΔT,

and ΔT is almost constant during a run of the electrolysis.

5.Measurement of Excess Heat

The measurement of the excess heat evolved in this system was carried out by detecting the temperature rise in Tw for an input power for 20 minuits using the apparatus shown in Fig.1.The volume of the electrolyte used was 50cc and the mass of the cathode was 3g. First the temperature rise by the Joule heating was measured by using a simple resistor for various input power,and the result is shown by a solid line in Fig.2. The temperature rise measured for

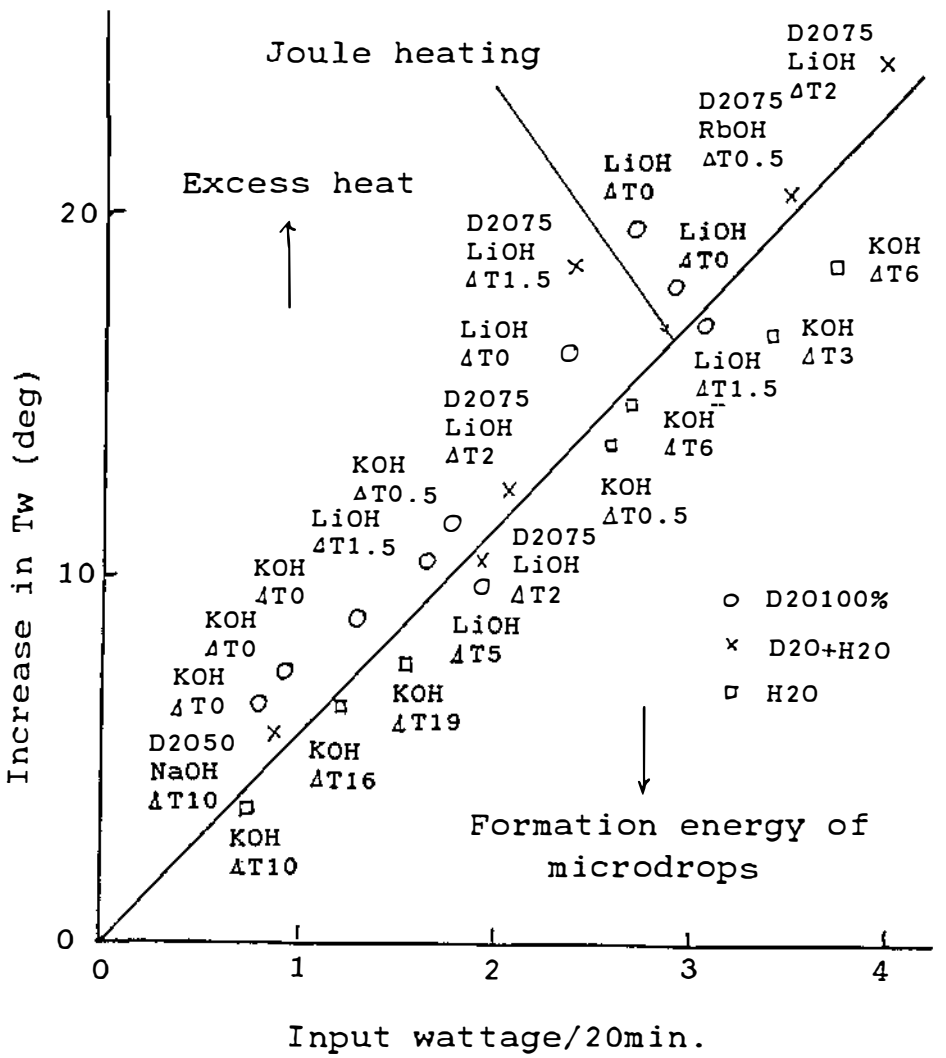

Fig.2 Excess heat generation in the electrolysis using charcoal cathode for D2O,D2O and H2O mixture and H2O.

various charcoal cathodes,for D2O,the mixture of D2O and H2O and H2O were plotted in Fig.2 by circles,crosses and squares respectively. The squares distribute under the line of Joule heating independent of the value of4T. The reason is attributed to the necessary formation energy of microdrops to corrode the cathode.The distribution of the circles and the crosses are mostly above the line of Joule heating,showing that excess heat larger than the formation energy is evolved in these experiments. Excess heat as much as about 30% of the input power was detected for a D2O75% electrolyte with 0.25NLiOH.

6.Conclusion

1)The synthesis action expected for the microdrops which arise in the charcoal cathode was very noticeable. The electrolysis changed the color of the electrolyte from colorless into dark brown.

2)Heat evolution was detected in the cathode as a parallel phenomenon to the synthesis action.

3)Excess heat was detected in the electrolysis for D2O and for the mixture of D2O and H2O but it was not detected for H2O.

4)Charcoal tends to form chemical compounds in the electrolysis and from this reason the fusion between deuterons, the cause of the excess heat,is poor.

5)It is doubtless that the microdrop plays the key role in the cold fusion.It is important to improve the fusion efficiency for the fundamental research and also for the practical application.

Referece

1.Takahashi,"Cold Fusion Explained by Negentropy Theory of Microdrop of Heavy Water,"Proc.4th Int.Conf.on Cold Fusion, Volume 4,29-1.