EXTRAORDINARY TRACES ON NUCLEAR EMULSIONS OBSERVED DURING ELECTRICAL DISCHARGE IN WATER

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ABSTRACT

Experiments of cold fusion were performed using electrical discharge in water. AC shots of up to 100 V were applied to wire electrodes of palladium, platinum and nickel in ordinary water mixed with potassium carbonate. The reactions were observed by nuclear emulsions and a system utilizing a microtelescope and a VTR (video tape recorder). It was shown that cold fusion reactions were easily induced on the surface of the metal. Strange traces indicating cold fusion reactions were recorded on the nuclear emulsions.

INTRODUCTION

The Nattoh Model [1] proposes that cold fusion reactions occur when a hydrogen cluster is compressed into a tiny particle. In the compressed state, internuclear distances are so short that various kinds of fusion-like reactions can take place: (1) a new two-body fusion reaction that predominantly contributes to heat production and mainly produces helium-4 instead of helium-3,
(2) multibody fusion reactions that contribute to the production of new elements and (3) in the most significant case, the production of tiny black holes and white holes. The compression process can be significantly enhanced by electrical discharge that induces additional electrons into the hydrogen clusters [2].

This paper describes cold fusion experiments using electrical discharge in water. The reactions were observed by a system utilizing a microtelescope and VTR and nuclear emulsions.

EXPERIMENT

Two kinds of cold fusion experiments were performed using electrical discharge: cold fusion directly induced by electrical discharge and implosive cold fusion induced by the explosions of the cold fusion reactions. Both experiments were made by applying AC shots (50 Hz and up to about 100 V) to wire electrodes in water.

The electrolyte solution consisted of ordinary water mixed with 0.6 Mol/l potassium carbonate. Wires of palladium, platinum and nickel were used for the electrodes. Two kinds of electrode arrangements were employed for the direct discharging cold fusion: vertical and parallel. In the former, a pin of the platinum wire (0.3 mm dia. x 2 mm long) was vertically located about 2 or 3 mm distance from the wire of palladium (0.5 - 2.0 mm dia. x about 25 mm long). In the latter, two wires of palladium, nickel and platinum (0.3 - 2.0 mm dia. x about 25 mm long) were located parallel to one another with a gap of 2 - 3 mm. For the implosive cold fusion that needs to concentrate on the electrical field, on the other hand, a helical electrode of nickel (0.5 dia.) was placed around a pin electrode of palladium (0.5 dia. x about 3 mm long). The diameter of the helical electrode was about 10 mm. The electrical discharge was employed with pulsed AC up to 100 V (20 - 80 msec ON and 1 - 15 sec OFF). The phase was fixed such that the voltage at the anode started to increase positively.

Reactions were directly observed with a system utilizing a microtelescope and VTR, that were located outside the bottom (acrylite plate of 2 mm thick) of a cylindrical glass cell. The cell was located such that the bottom was vertical. Pictures from the microtelescope (10 - 100 times amplification) were recorded on the VTR. Important pictures were then picked up stepwise with a color copier.

Reaction products of cold fusion were recorded using nuclear emulsions, that were similar to that previously used [3]. Although it takes a long time to search for traces on the nuclear emulsions, they are very sensitive and the traces contain a lot of credible information that can contribute to identify the reaction products. The nuclear emulsions (made by Fuji Film Inc.; MA-7B) of 100 μm thick were coated on both sides of an acrylite plate of 1 mm thick x 50 mm x 50 mm. The nuclear emulsions coated on the acrylite plates were partly provided by Fuji Film Inc. Some nuclear emulsions were coated in our laboratory in order to reduce background traces. The nuclear emulsions were irradiated by natural radiation so they should be used as soon as possible after the coating, at least within a month. After irradiation, the nuclear emulsions were treated in solutions that are available for usual processing of films. Since the nuclear emulsions were thick, the processing time was long: 25 min in a developing solution, 15 min in a stopping solution and 150 min in a fixing solution, respectively. Traces on the nuclear emulsions were searched by a microscope (500 times amplification) that provided a transmission and reflection lights. The former was used when the traces were located inside the nuclear emulsions. The latter was useful not only for traces recorded on the surface but also for distinguishing noise. To distinguish the noise traces, reference nuclear emulsions were located about 5 m from the cell in the same room.

RESULTS: (a) Direct Discharging Cold Fusion

Fig. 1 shows a sequence of pictures taken by the VTR system of the discharge in the vertical arrangement. The time step was 33 msec. An explosion was induced on the surface of the palladium pin (0.5 mm dia. x 3 mm long) and left it hot. A couple of wave fronts that were reflected by the AC cycle could be clearly seen in the pictures, and particles with high energy seem to have been emitted. The observation of the nuclear emulsions showed that the explosion was a cold fusion reaction and that the pin electrode was heated to a red temperature by the released energy. The VTR system also recorded explosive reactions induced in the parallel arrangement. Here it is clearly shown that explosive reactions took place on the surface of the wire.

Several extraordinary traces were recorded on the nuclear emulsions located outside the acrylite window. The first is a star that emitted a lot of fragments, shown in Fig. 2. Similar traces were also observed in a previous experiment [4]. A star can be created inside the nuclear emulsion by a multibody fission reaction of a heavy nucleus such as silver, that becomes a highly excited compound nucleus by capturing a multiple-neutron emitted from the cell.

The second is the observation on explosive traces that can be generated by the gravity-decay of multi-neutrons. Similar traces were also observed in the previous experiments [l]. This trace is one of the most credible pieces of experimental evidence indicating that cold fusion has taken place. When the hydrogen-cluster is compressed to induce a cold fusion reaction, hydrogen atoms that are not directly involved in a fusion reaction should scatter. Those traces could be clearly seen. Simultaneous plural reactions might take place in the compressed hydrogen-cluster. Fortunately, pictures indicating such reactions were taken by chance with mismade nuclear emulsions that were thinner.

The third phenomena are strange combined rings that were first observed in this experiment. The rings can be clearly distinguished from the previous explosive traces because they were recorded only on the surface and had combined with each other. The diameter of the combined rings is different in each event but similar within the same event. The events were densely concentrated between the first and second nuclear emulsions.

(b) Implosive Cold Fusion

Implosive cold fusion experiments were attempted by applying AC shots to a helical wire within which a strong electrical field was concentrated to the tip of the pin electrode. A sequence of two explosions occurred. The first explosion was directly induced by the discharge. The second explosion was not induced by the electrical discharge, but by the first cold fusion reactions. This was caused by the duration of the discharge which was 80 msec, and the second explosion occurred after 100 msec. After the explosions, fine black materials remained.

DISCUSSIONS

In this paper, two kinds of cold fusion experiments were attempted. In the direct discharge experiment, AC shots of up to 100 V were applied to wire electrodes that were located parallel to one another and vertically. We could actually see the cold fusion reactions on the surface of the metal by the VTR system. This means that the hydrogen charging into the metal is not always needed for inducing cold fusion as the Nattoh model predicted. The traces on the nuclear emulsions showed the production of stars and the gravity-decays of multiple-neutrons. All of those traces were already obtained in previous experiments [l].

The strange traces of the combined rings, first observed in this experiment, suggest the production of tiny black holes. The tiny black holes that were produced in the cell dropped down to the space between the first and second nuclear emulsions. They seem to have continued hopping there and remained as the combined rings.

Secondly, implosive cold fusion was successfully attempted. It can be expected to release higher energy.

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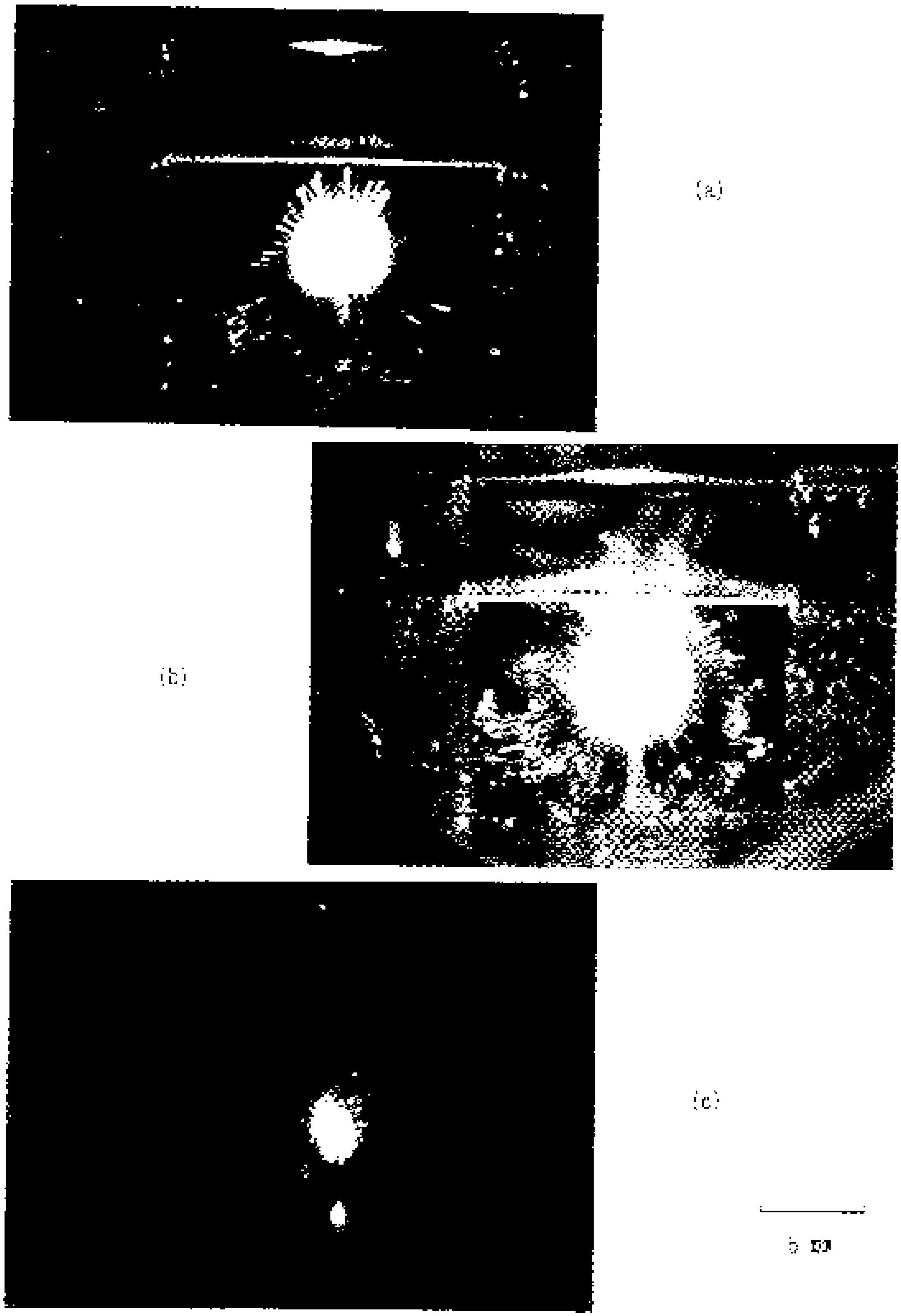

Fig. 1: Explosion in the vertical arrangement

Fig. 2: Cold fusion star