The Nuclear Transmutation Induced by the Electrolysis Using Tungsten, Rhenium and Gold Electrodes

(Mainly Plasma Electrolysis with Tungsten and Rhenium)

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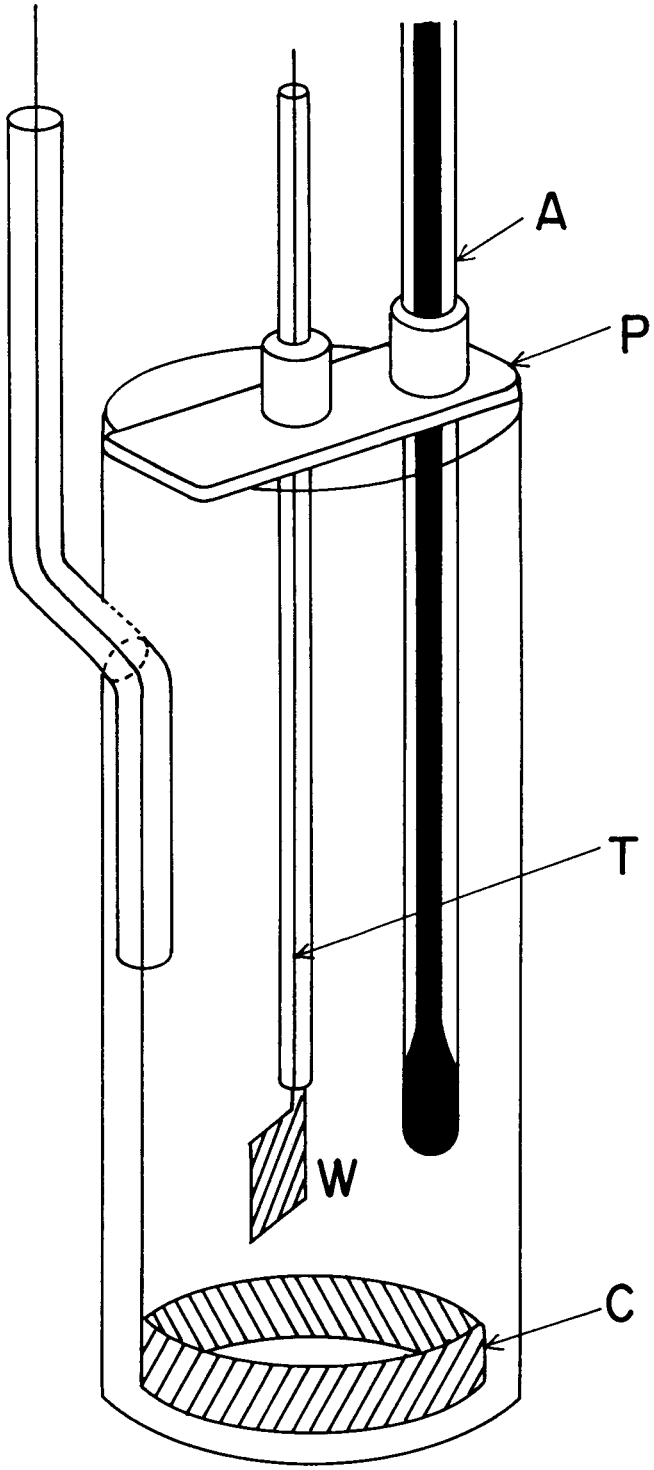
DEVELOPMENT

1. Nuclear transmutation in Au / H_2O electrolysis system.
2. Nuclear transmutation in W, Re / H_2O plasma electrolysis system.
3. Nuclear transmutation in Re / D_2O plasma electrolysis system.

RESULTS

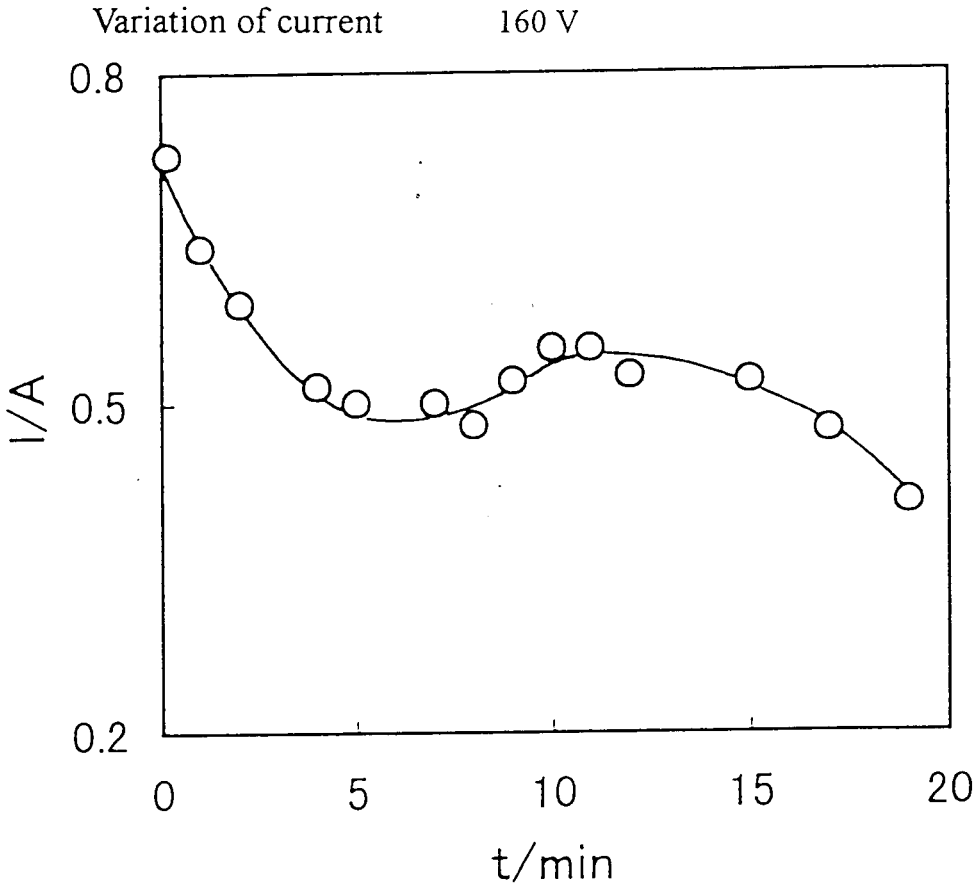
1. Excess heat evolution ranging 50 – 150 W.
2. Detection of new elements with anomalous isotopic distribution.
3. Anomalous topography of the electrode surface after electrolysis.

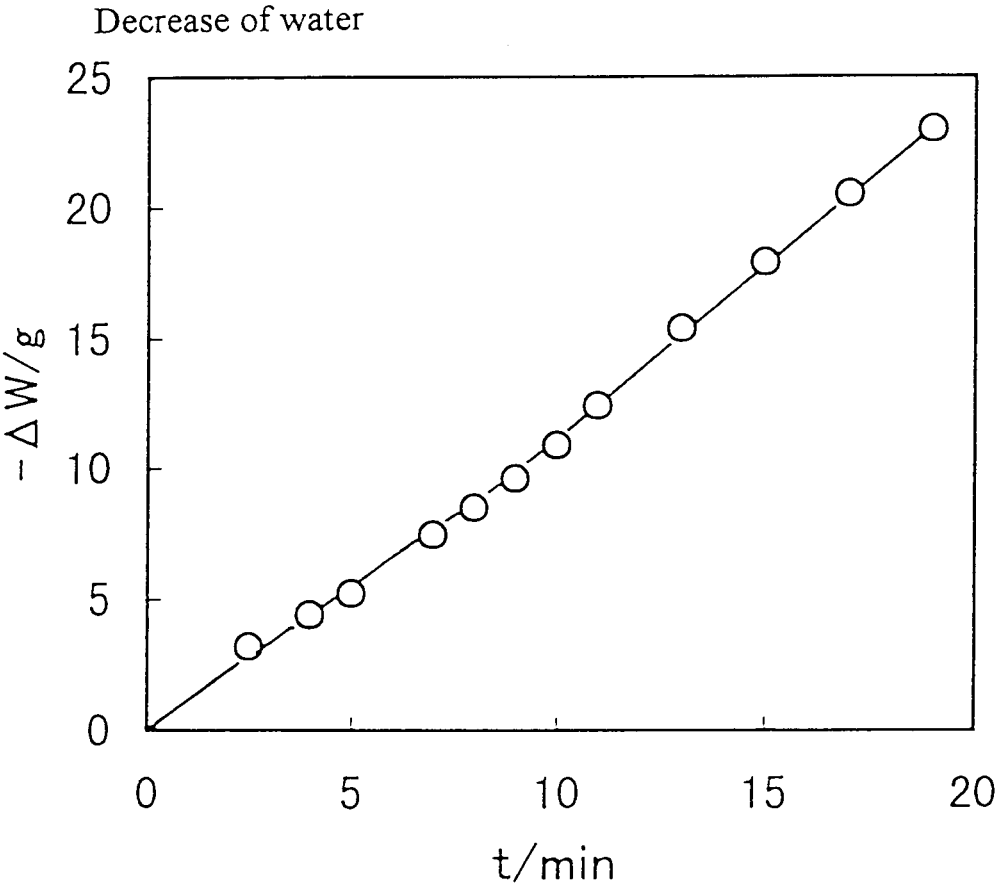

A
P
T
W
C

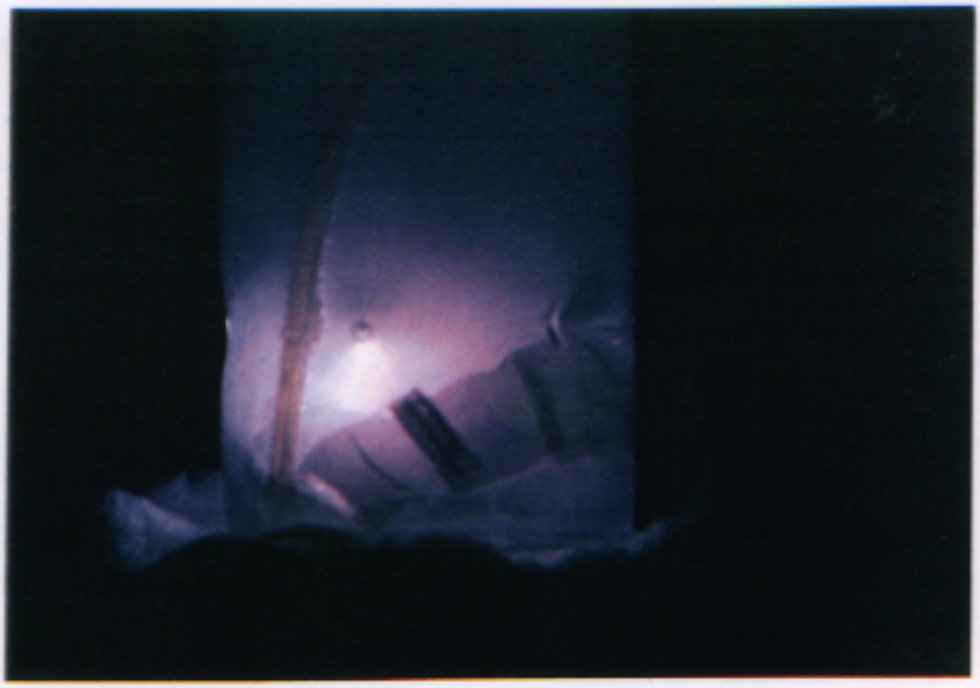
WORKING ELECTRODE UNDER AN INCANDESCENT CONDITION

When electrolyzed under this condition, the working electrode was suddenly heated incandescently and reddish-purple glow emerged in the solution around the electrode. A typical incandescent situation of the electrode is shown in this picture. This condition was continued during the electrolysis.
Perhaps, the glow is caused by plasma emerged from the W electrode. It is surprising That the plasma is formed even in such a liquid phase. The temperature of the solution was 85℃ just before the ignition. After the ignition, the temperature rapidly increased and reached its boiling point within 80 sec. This phenomenon was easily reproduced. We measure the temperature using both thermocouple and alcohol thermometer. After the ignition, the measurement by the thermocouple becomes impossible owing to the strong emission of the electromagnetic wave, so that we used alcohol thermometer.

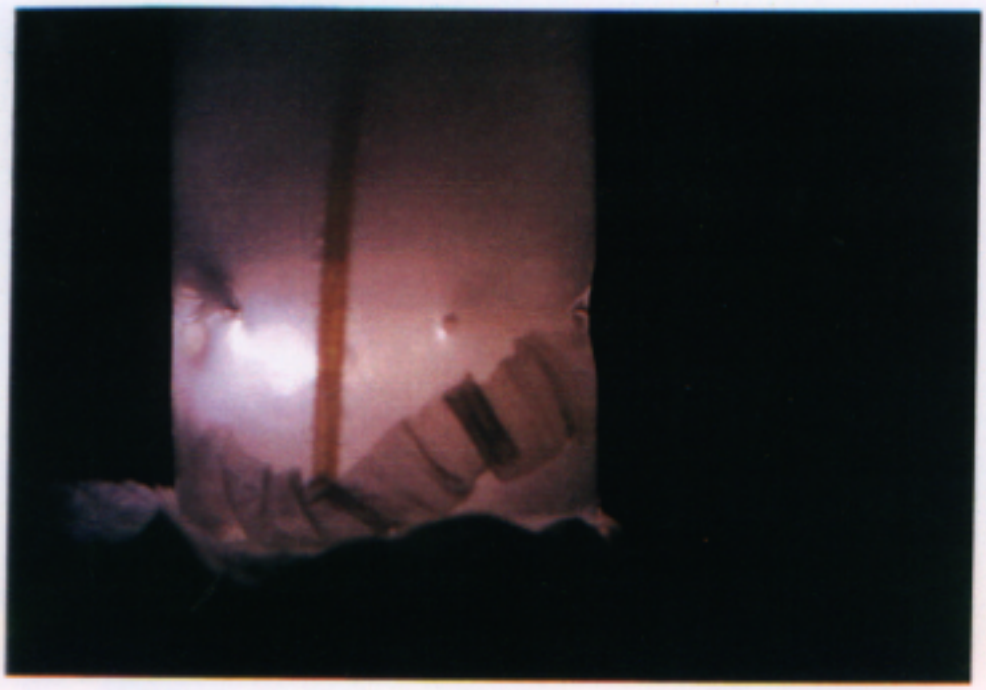
Decrease of water in solution after incandescent condition







Wave length of potassium: 404.72, 404.41 nm



Wave length of hydrogen: 636.28, 486. 13, 434.05, 410.17 nm
Wave length of oxygen: 700.22, 645.61, 645.46, 645.37, 436.83 nm

Method of Excess Energy measurement

$$E = W_{vap} + W_{sol} + W_{cell} + W_{wall} - W_{in}$$

W_{vap}: heat necessary to vaporize the water of solution.

W_{sol}: heat necessary to rise the solution temperature up to 100℃.

W_{cell}: heat necessary to rise the cell container up to 100℃.

W_{wall}: heat effused through the wall of the cell container during the electrolysis.

W_{in}: input energy (current x input voltage)

Excess Heat Evolved in the H_2O Electrolysis on Tungsten Electrodes

Electrode	Solution	Conc. M	Volume ml	Time min	Hin W	Hout W	Excess H W	Efficiency %
W	Na2SO4	0.5	170	30	107	213	106	199
		0.5	170	30	112	196	84	175
		0.5	170	30	104	191	87	184
	Na2CO3	0.5	150	30	99	162	63	164
	NaNO3	0.5	150	6	101	224	123	222
		0.5	150	23	101	188	87	186
	NaClO4	0.5	140	15	112	197	85	176
	K2CO3	0.5	120	15	104	199	95	191
		0.5	120	15	96	174	78	181
		0.5	170	30	77	181	104	235
		0.5	170	30	86	196	110	228
		0.5	150	30	85	174	89	205
		0.5	150	30	85	156	71	184
		0.5	150	30	71	132	61	186
	KNO3	0.5	150	30	93	185	92	199
	Rb2CO3	0.25	170	30	94	228	134	243
		0.25	170	30	93	162	69	174
		0.25	150	30	69	143	74	207
		0.5	120	15	125	195	70	156
	Cs2CO3	0.25	150	30	71	155	84	218
		0.25	150	30	99	163	64	165
		0.25	150	15	94	205	111	218
	Ba(NO3)2	0.25	150	30	70	147	77	210
	Ba(ClO4)2	0.25	170	30	78	173	95	222
		0.25	170	15	83	188	105	227

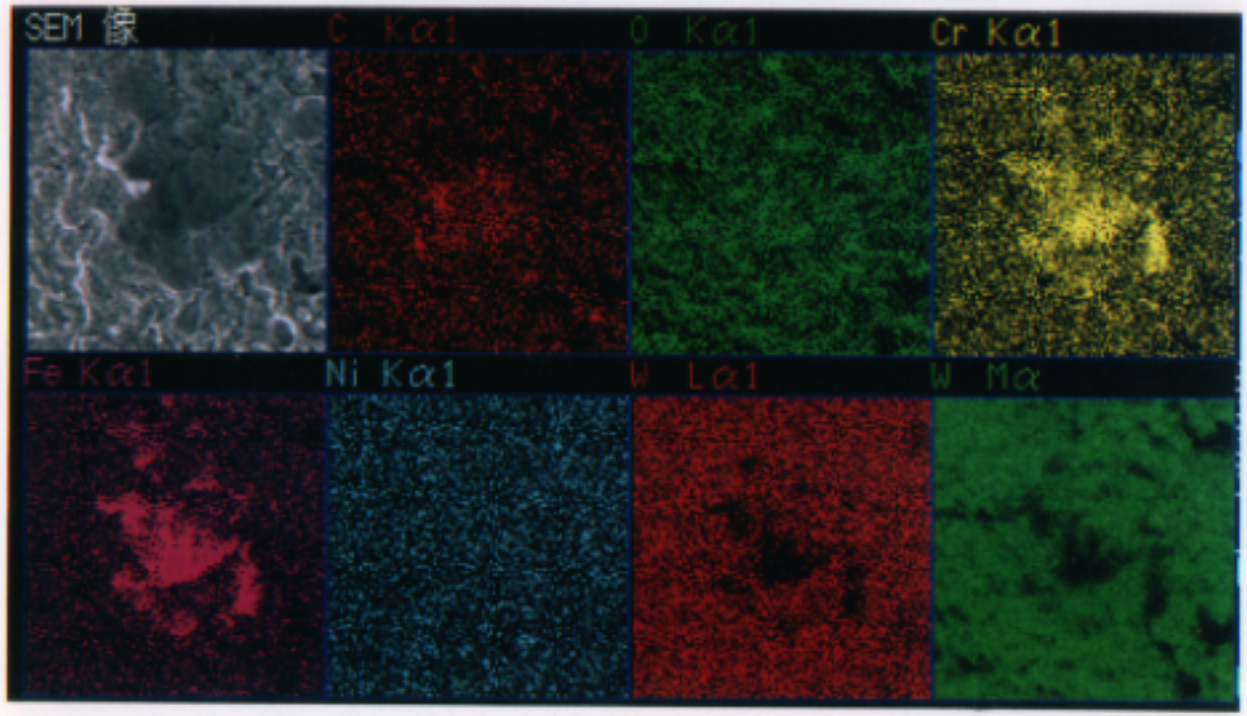
Excess Heats Evolved in the Electrolysis on Rhenium Electrode

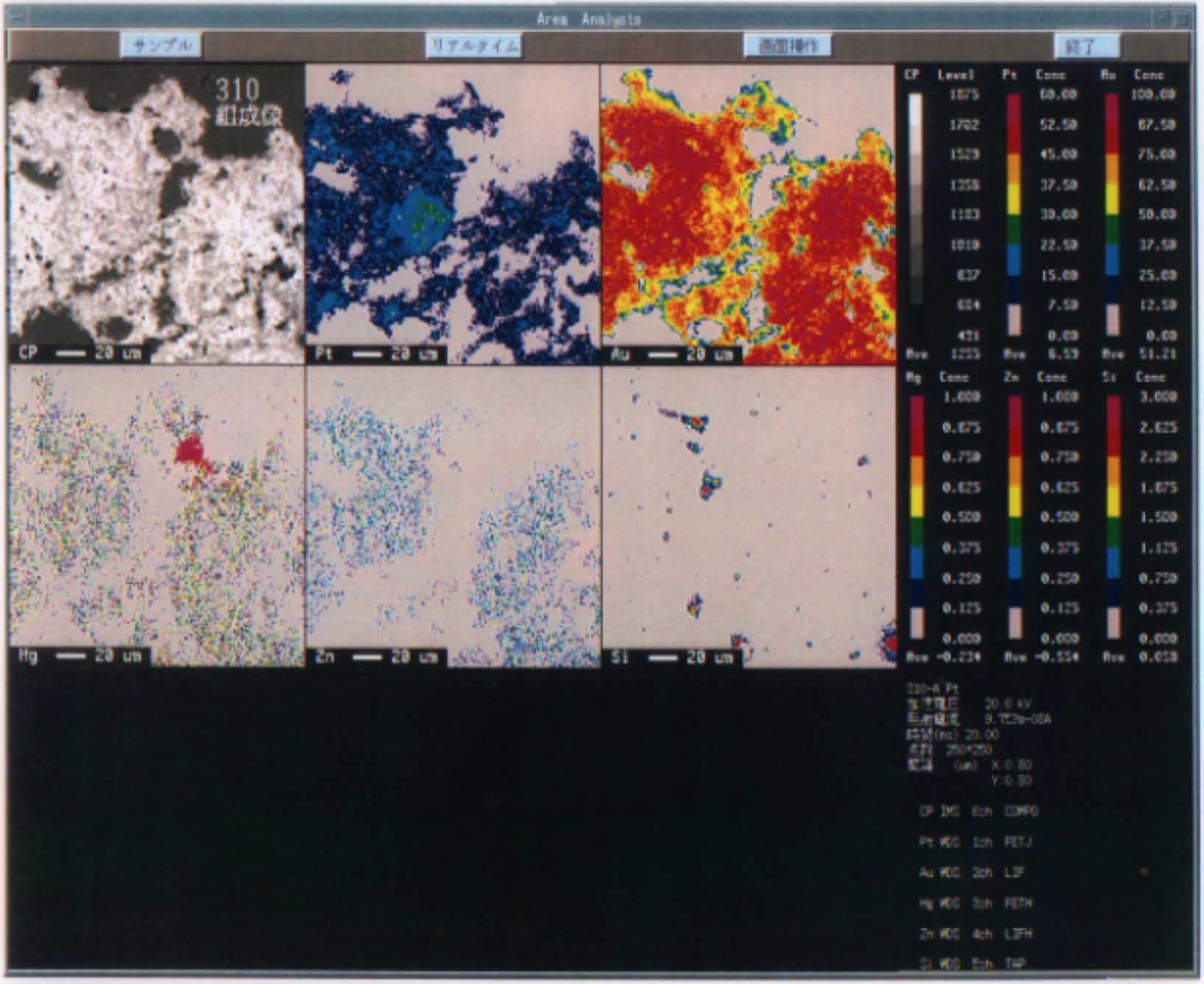
H2O electrolysis

Electrode	Solution	Conc. M	Volume ml	Time min.	Hin W	Hout W	Excess H W	Efficiency %
Re	K2CO3	0.5	150	16	86	137	51	159
		0.5	150	18	82	134	52	163
		0.5	175	7	88	160	72	182
		0.5	175	9	83	170	87	205
		0.5	175	19	85	131	46	154
		0.5	175	10	89	148	59	166

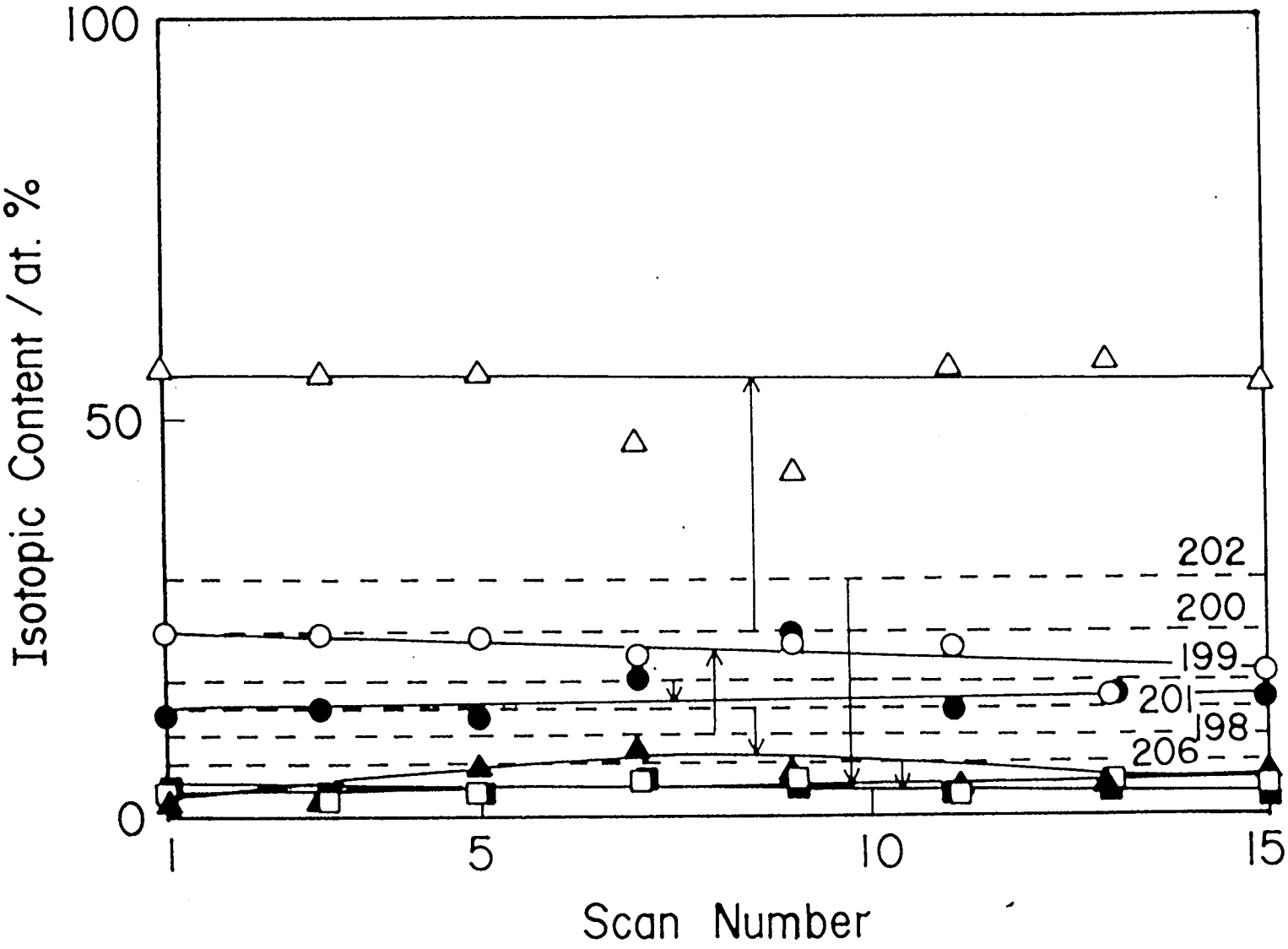
D2O electrolysis

Electrode	Solution	Conc. M	Volume ml	Time min.	Hin W	Hout W	Excess H W	Efficiency %
Re	K2CO3	0.5	150	15	65	58	123	211
		0.5	150	18	78	138	60	178
		0.5	150	14	95	155	60	163
		0.5	150	15	66	128	62	192


SEM 像
C Kα1
O Kα1
Cr Kα1
Fe Kα1
Ni Kα1
V Lα1
W Mα


Area Analysis
サンプル
リアルタイム
画面操作
終了
310
組成像
CP — 20 um
Pt — 20 um
Au — 20 um
Hg — 20 um
Zn — 20 um
Si — 20 um
CP Level
Pt Conc
Au Conc
Hg Conc
Zn Conc
Si Conc
Ave 1255
Ave 6.59
Ave 51.21
Ave -0.234
Ave -0.554
Ave 0.658
310-A Pt
CP IMG 6ch COMPO
Pt WDS 1ch PETJ
Au WDS 2ch LIF
Hg WDS 3ch PETH
Zn WDS 4ch LIFH
Si WDS 5ch TAP

Isotopic Distribution of Hg Present on a gold electrode
After the H_2O Electrolysis (by SIMS)



Isotopic distribution of Si present in the deposits measured from 1 to 15 scans

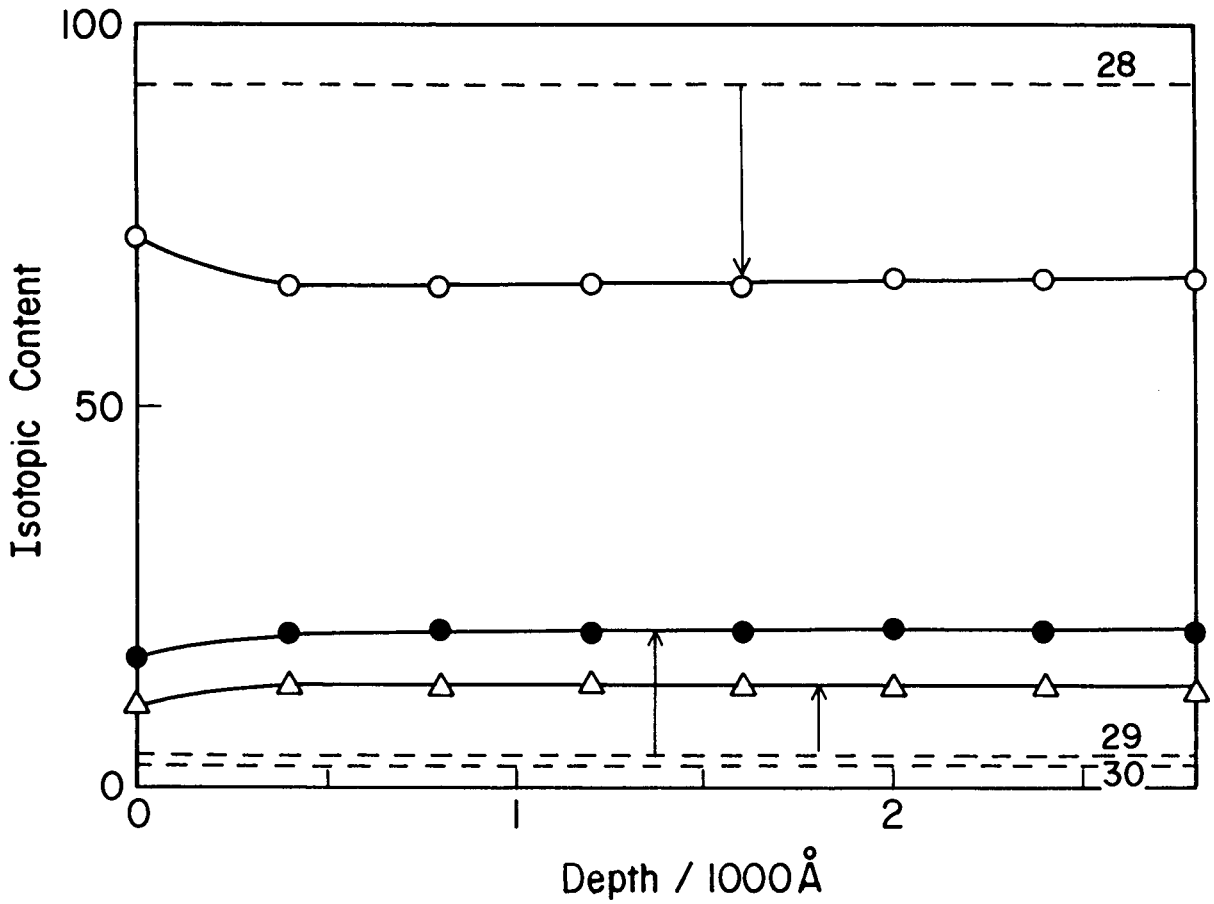


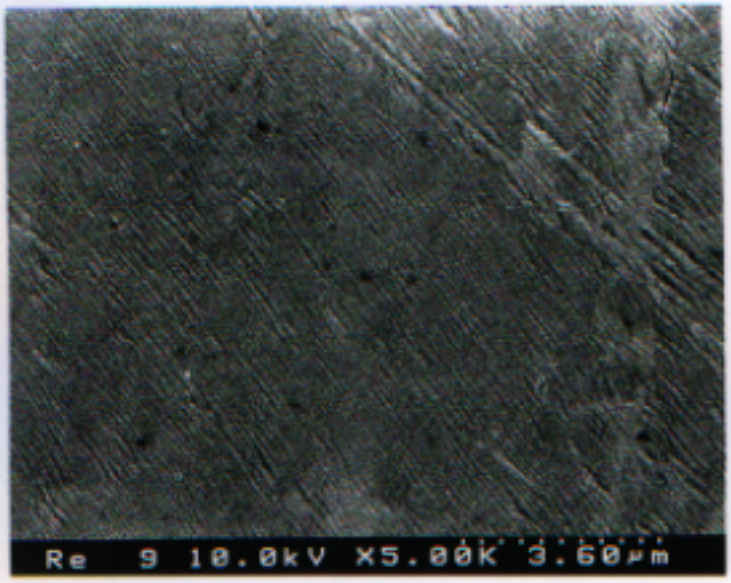
TABLE II

Isotopic Contents of Product Elements Present on/in the Electrode within 160 Å from the Electrode Surface and Tungsten of the Electrode Material

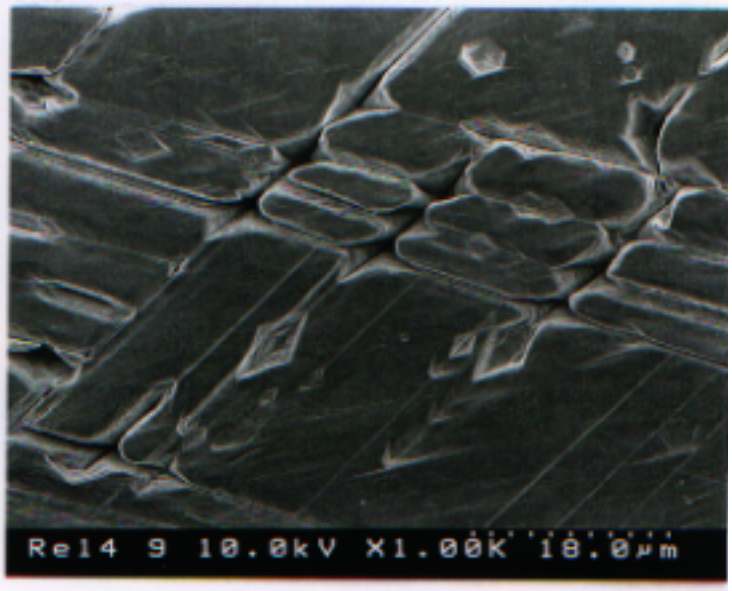
Element	Isotope	Isotopic Content at.%	Natural Isotopic Abundance at.%
Cr	$_{50}Cr$	6.1	4.31
	$_{52}Cr$	79.1	83.75
	$_{53}Cr$	12.4	9.55
Fe	$_{56}Fe$	91	91,66
	$_{57}Fe$	2.9	2.19
Ni	$_{58}Ni$	63	67.98
	$_{60}Ni$	30.8	26.23
Re	$_{183}Re$	48.4	37.1
	$_{185}Re$	51.6	62.9
Pb	$_{206}Pb$	38.5	25
	$_{207}Pb$	55	22
	$_{208}Pb$	6.5	52
W	$_{182}W$	25.3	26.3
	$_{183}W$	14.9	14.3
	$_{184}W$	30.4	30.6
	$_{186}W$	29	28.6
	$_{182}W$*	26.6	26.3
	$_{183}W$*	14.5	14.3
	$_{184}W$*	30.4	30.6
	$_{186}W$*	29	28.6

* Isotopic contents of W within 1700 – 2400 Å from the electrode surface.

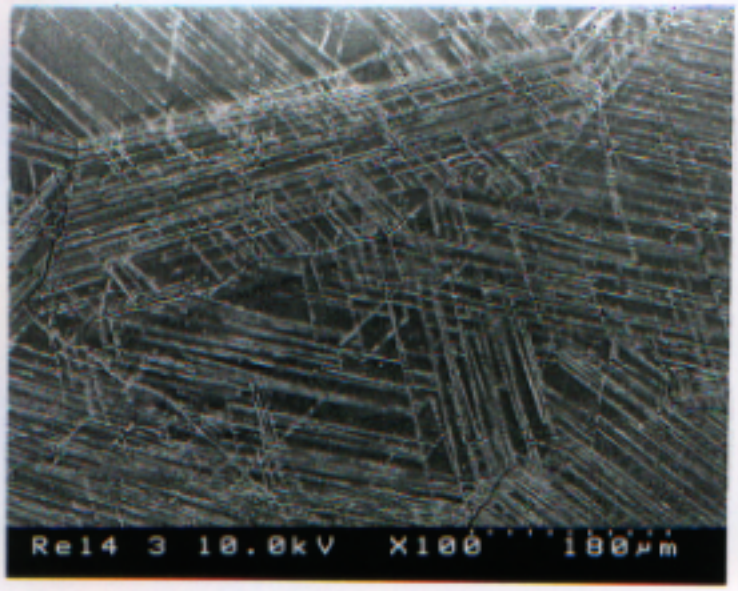
A


Re 9 10.0kV X5.00K 3.60µm

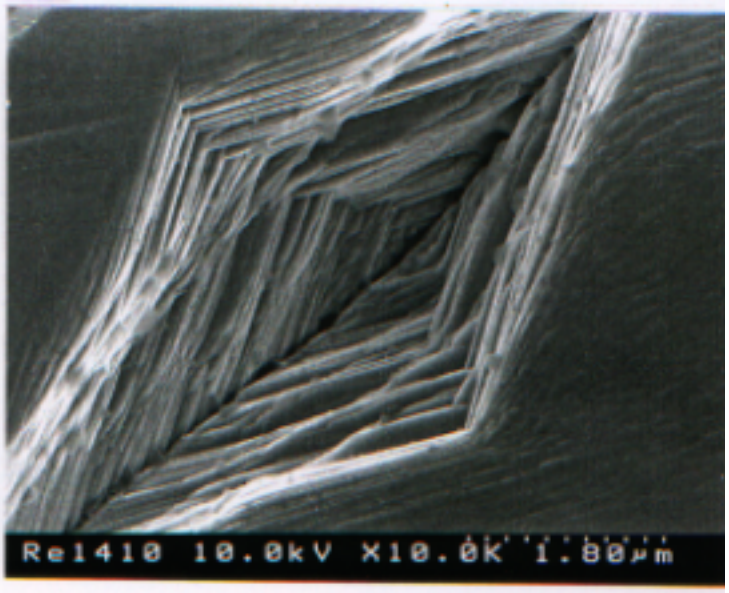
D


Re14 9 10.0kV X1.00K 18.0µm

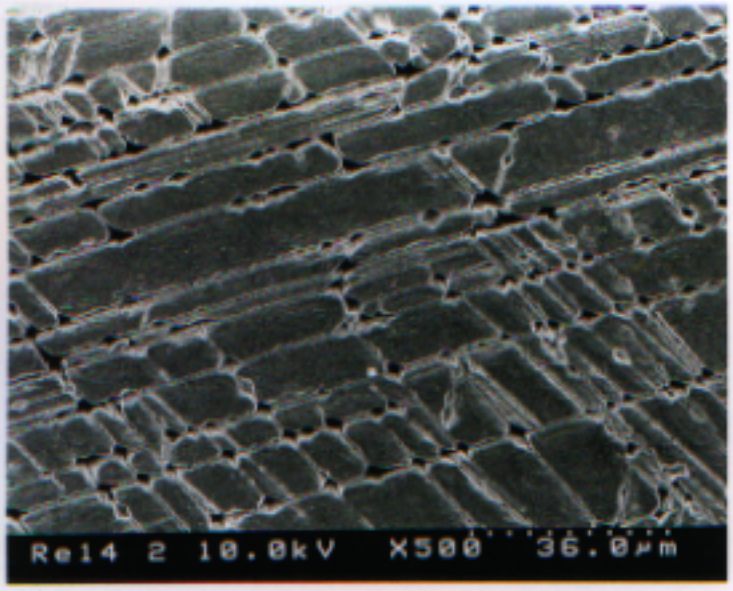
B


Re14 3 10.0kV X100 180µm

E

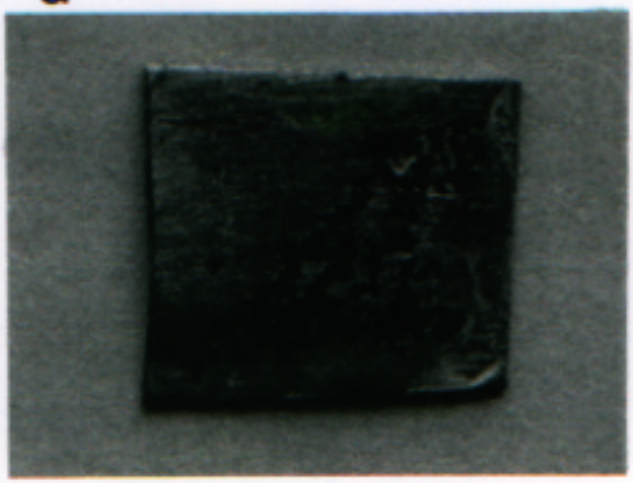

Re1410 10.0kV X10.0K 1.80µm

C

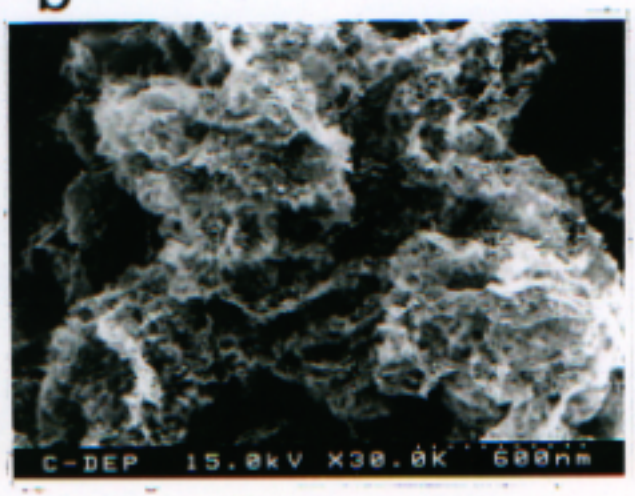

Re14 2 10.0kV X500 36.0µm

Structures of the deposits from the craters of the Au electrode formed during the electrolysis

a

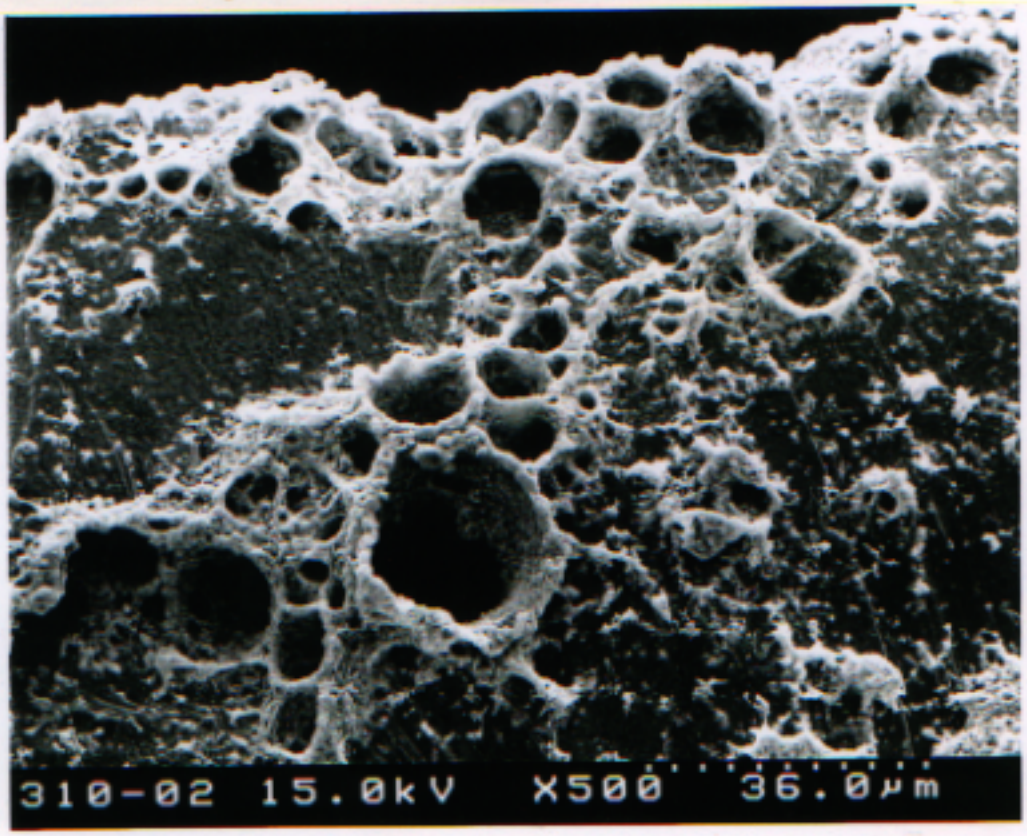


b

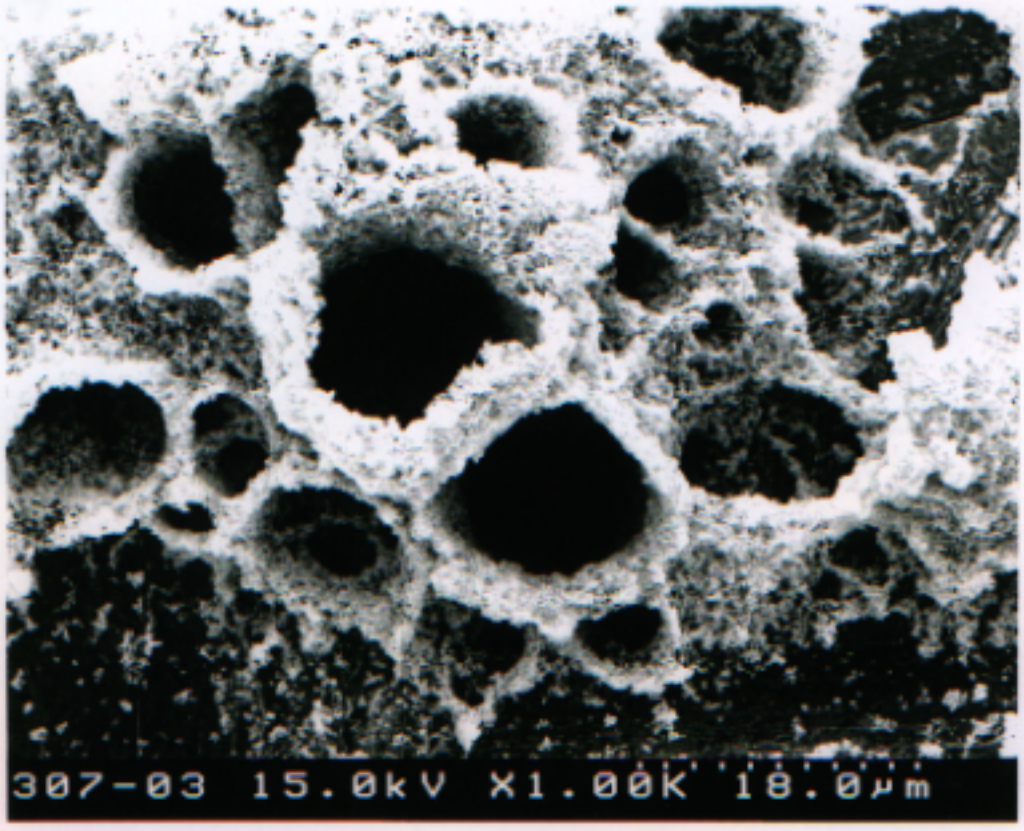


A

The surface of the Au electrode after the electrolysis at a current density of 0.75 A/cm^2



B



$$H^+ + e^- \rightarrow n$$

$$D^+ + e^- \rightarrow {}^2n$$

$$Au + n \Rightarrow Hg \Rightarrow \begin{matrix} Fe \\ Zn \\ Si \end{matrix}$$

$$W + n \Rightarrow \begin{matrix} Re \\ Pb \end{matrix} \Rightarrow \begin{matrix} Fe \\ Cr \\ C \end{matrix}$$

Where the energy producing neutron come from? From vacuum ?

Summary

- Excess heat was confirmed during the plasma electrolysis of tungsten electrode.
- Many elements were detected on the electrode and in the electrolyte for the case of excess heat generated experiment.
- Experimental results can be well explained by the photo fission mechanism.