

# 열처리에 따른 치과도재용 합금의 표면특성에 관한 연구

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=Abstract=

## The Surface Property Change of the Heat Treated Dental Porcelain Alloy

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The purpose of this study was carried out by observing to composition of an oxide on the surface of Dental porcelain alloy according to the conditions of its heat treatment and analysing the change composition on its surface.

Morphological change of the heat treated dental porcelain alloy have been investigated with SEM and EDX. The result of this study is summarized as follows.

The surface indium concentration of specimens increased as the heat treatment temperature and the oxygen partial pressure increased.

## 1. 서론

(porcelain)

(porcelain crown)

(porcelain fused to metal crown:P.F.M)

1958

Abraham B. Weinstein

, 가

(P.F.M)

가

가

, Van der Waals force

(scanning electron microscope:

SEM), EDX(energy dispersive X-ray analysis)

Indium

가

가

Sn

In

가

## II. 실험방법

가

MATTICRAFT

G(Cookson Co. England)

Table 1.

McLean

McLean, Miyagawa Sn  
Bullard Al<sub>2</sub>O<sub>3</sub> In<sub>2</sub>O<sub>3</sub>가

SnO<sub>2</sub>가,  
SnO<sub>2</sub>

Table 1. Nominal chemical composition of the ceramic bonding alloy(Matticraft G)

Au	Pt	In	Ag	others
86.1%	10.6%	2.0%	0.2%	<2.0%

. Cho  
Indium

, Yamamoto  
가

50%

porcelain

baseplate wax  
investment casting  
(Heraeus Co. Germany)

Sand blasting  
sand paper grinding 10

, 가

4

crack

가

A : sand paper grinding

In, Sn

. Indium

B : A 650 10 60 torr

C : A 650 60 torr

980 25

980 10

(Wettability)

D : C

Indium

(furnace) Ney Co.(U.S.A)  
 Mark (SEM, HITACHI.  
 Co. Japan)  
 EDX(KeveX. Co. U.S,A) X-ray  
 spectrum spectrum

Fig 4. 980 10  
 Indium

### III. 실험결과 및 고찰

#### 1. 주사전자현미경 관찰

Fig. 1. Fig. 4.

Fig. 1.  
 grinding

10

Fig 2. 650  
 Fig 1

Fig 3. 980 10  
 grinding  
 가

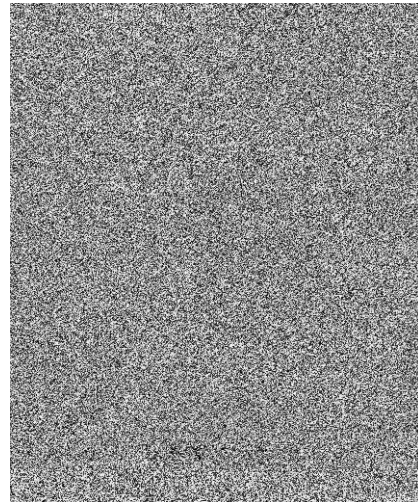


Fig 2. The SEM picture of the specimen B(650 , 10 min vacuum heat teated)

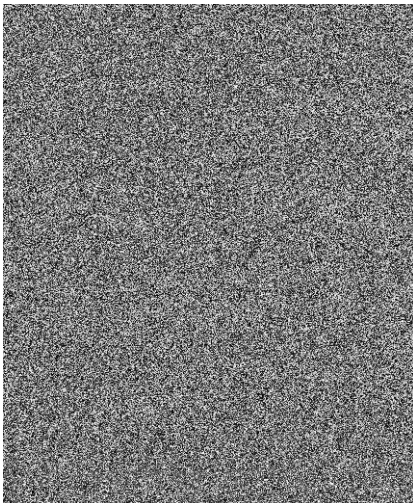


Fig 1. The SEM picture of the specimen A(no heat treatment)

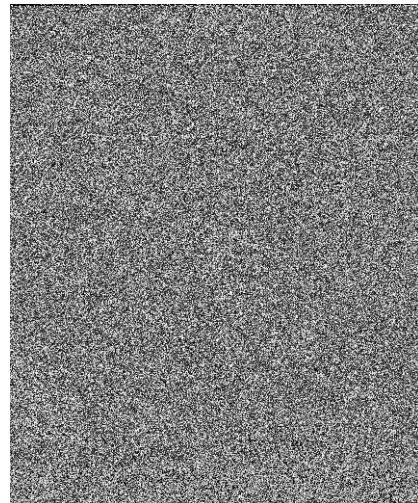


Fig 3. The SEM picture of the specimen C(980 , 10 min vacuum heat teated)

## 2. EDX분석

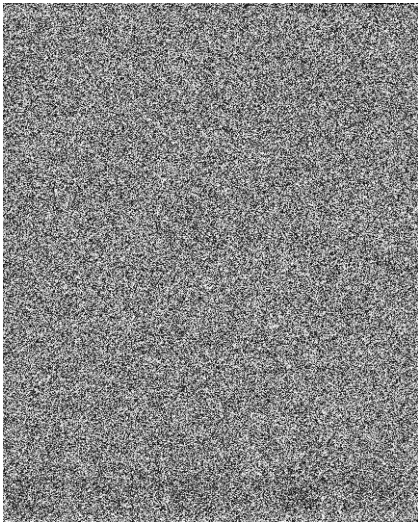


Fig 4. The SEM picture of the specimen D(980 , 10 min heat teated in air)

1000

SEM

X-ray spectrum

KeveX

Fig 5.

Fig 8.

Table 2

Indium

Fig 9.

Table 2. The EDX results of the sepcimen A, B,C, D by weight %

성분 시편	In	Ag	Pt	Au
A	5.23	0.00	10.68	84.09
B	31.46	0.00	6.08	62.46
C	40.05	1.92	7.23	50.80
D	55.59	2.64	5.24	36.53

Spectrum: SPECTRUM1

Range: 10 keV

Total Counts=157601 , Linear VS=10000

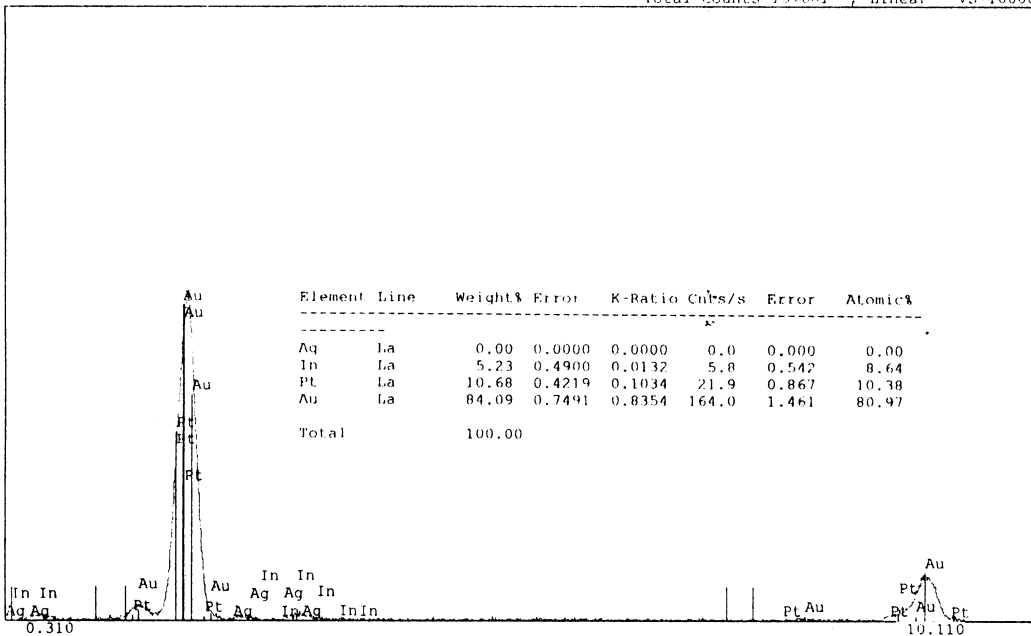


Fig 5. Edax line scan of the specimen A

Spectrum: SPECTRUM1

Range: 10 keV

Total Counts=129049 , Linear VS=5000

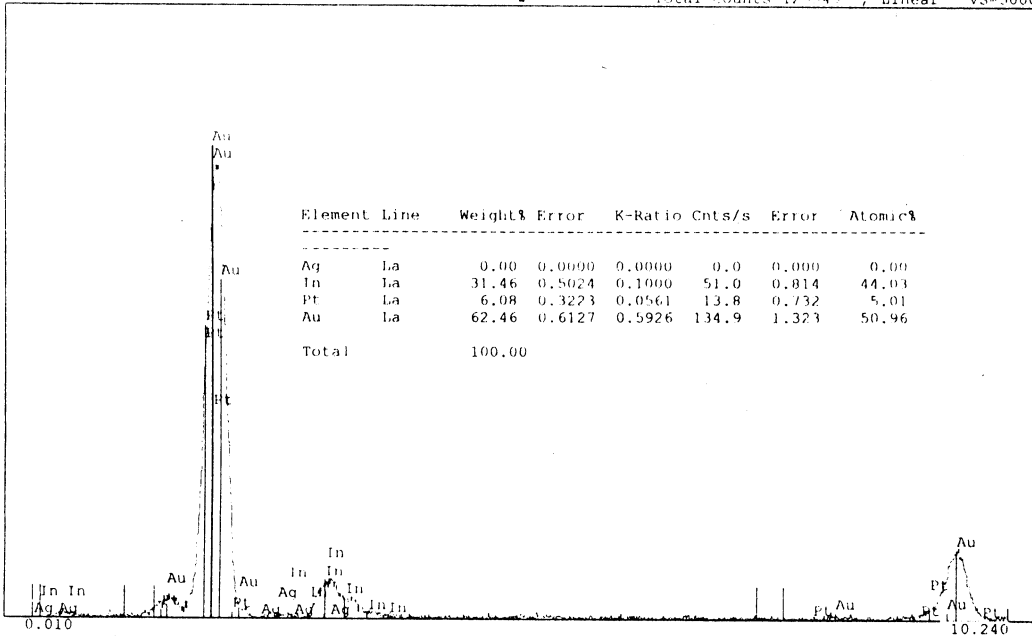


Fig 6. Edax line scan of the specimen B

Spectrum: SPECTRUM1

Range: 10 keV

Total Counts=110503 , Linear VS=5000

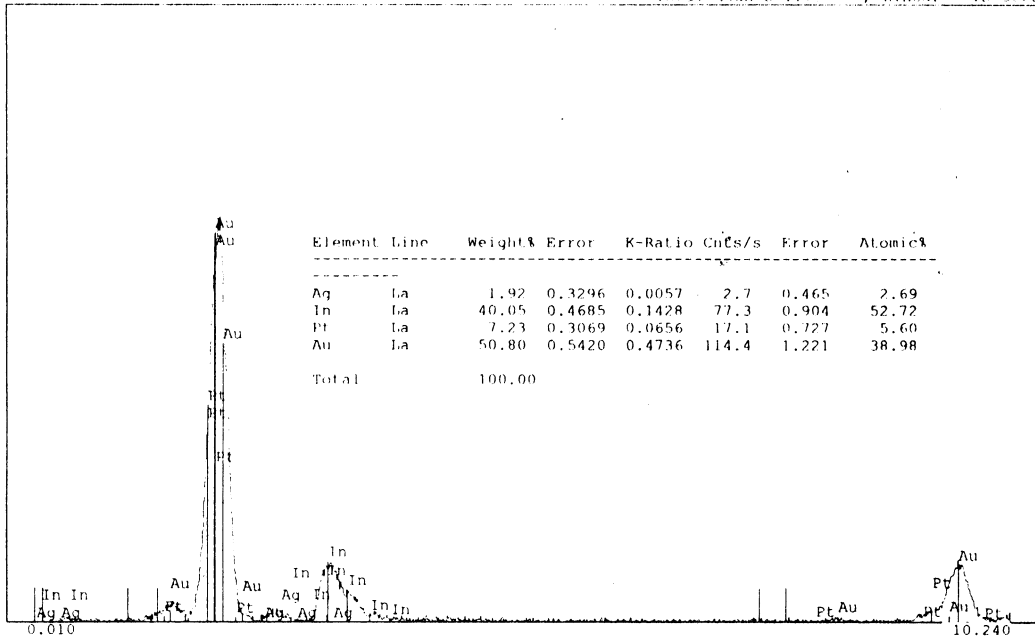


Fig 7. Edax line scan of the specimen C

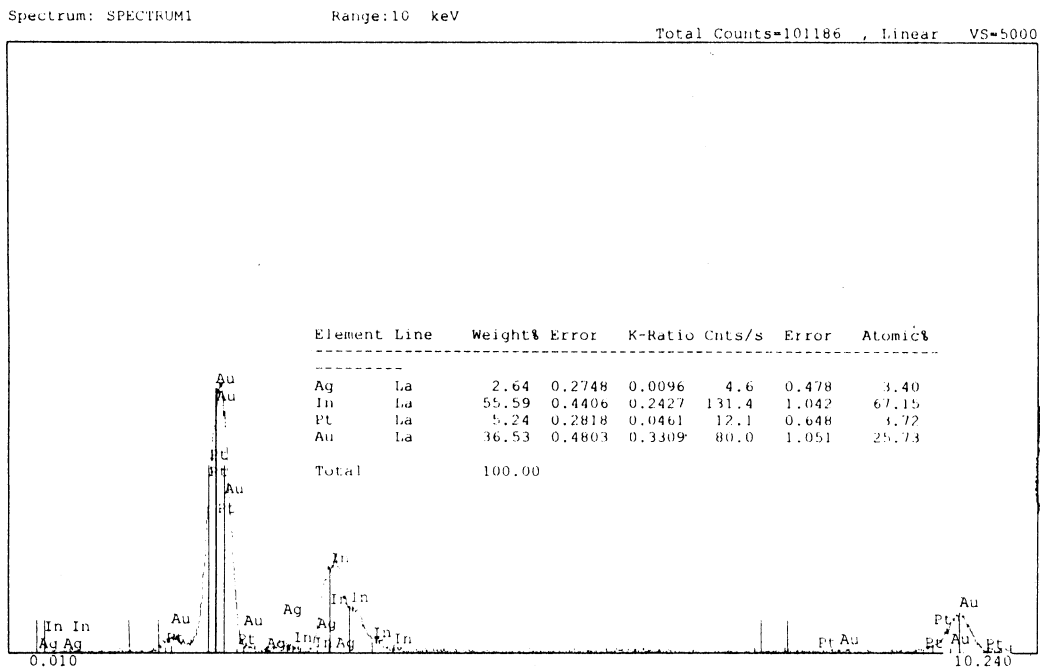


Fig 8. Edax line scan of the specimen D

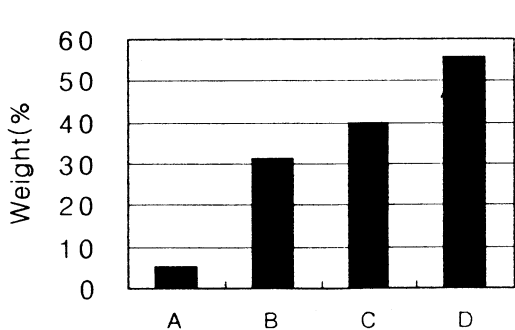


Fig 9. The diagram of the Indium composition of specimen A, B, C, D

가 Indium 가  
 650  
 peritectic reaction  
 1  
 Indium Indium rich  
 가 가  
 Indium 가

EDX Table 2. Fig 9.

가 가 Indium  
 3 Indium rich  
 가 Indium  
 rich 1. 가 Indium

#### IV. 결 론

가 가 .  
2.  
가 .

Indium 가

## 참고 문헌

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