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[\[PDF \(678K\)\]](#) [\[References\]](#)**Cross-sectional TEM Analysis of Porcelain Fused to Gold-coated Titanium**[Yasuhiro TANAKA](#)¹⁾, [Ikuya WATANABE](#)²⁾ and [Toru OKABE](#)²⁾

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Abstract:

This study investigated the interfacial microstructure between gold-coated titanium and low-fusing porcelain. The square surfaces of cast titanium split rods were sputter-coated with gold using a sputter coater at 40 mA for 1,000 seconds. Specimens were prepared for transmission electron microscopy (TEM) by cutting and polishing two pieces of the gold-coated split-rod specimens, which were glued and embedded in Cu tubes with an epoxy adhesive. TEM observation was also conducted for the gold-coated specimens after degassing and porcelain fusing. Due to the gold coating, intermetallic compounds of Au-Ti formed under the sputtered gold layer after degassing and porcelain fusing. Ti_3Au and Ti_3Al layers were also observed beneath the Au-Ti intermetallic compound layer. There was good adhesion of porcelain to the Au-Ti compound and Ti oxides without any gaps or formation of a Ti-deficient intermediate layer, which is normally observed at the titanium-porcelain interface. The results of this TEM study suggested that gold-sputter-coating the cast titanium surface produced a Ti-Au intermetallic compound and suppressed the formation of a Ti-deficient intermediate layer, resulting in improved adherence between porcelain and titanium.

Key words:[TEM](#), [Titanium-porcelain interface](#), [Gold coating](#)

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