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[\[PDF \(1809K\)\]](#) [\[References\]](#)**Study on fabrication of orthodontic brackets with the photocatalytic function of titanium dioxide**

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Abstract:

We sought to investigate whether the photocatalytic function of rutile-type titanium dioxide is applicable for orthodontic brackets. To this end, TiO₂ specimens were compressed and sintered. Then, each specimen was analyzed by X-ray diffraction to confirm that no compositional changes had taken place. Next, the surface of each specimen was observed with a colorimeter, scanning electron microscope (SEM), and atomic force microscope (AFM). Fundamental material properties after calcination were measured. The photocatalytic function was evaluated using the decolorization method with toluidine blue. The following were observed with the increase of calcinations temperature: growth of crystal particles, decrease in surface roughness and surface brightness, but increase in shrinkage percentage and compressive strength. The aesthetic and mechanical properties of TiO₂ material were adequate when compared with other bracket materials. In addition, it had a satisfactory photocatalytic function after high-temperature calcination. Based on the favorable results obtained, rutile-type titanium dioxide seemed to be applicable for the fabrication of self-cleaning orthodontic brackets.

Key words:[Photocatalysis](#), [Titanium dioxide](#), [Bracket](#)

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