

## Mn 이 첨가된 BaTi<sub>4</sub>O<sub>9</sub>-ZnO-Ta<sub>2</sub>O<sub>5</sub> 세라믹스의 특성

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## Properties of Mn-doped BaTi<sub>4</sub>O<sub>9</sub>-ZnO-Ta<sub>2</sub>O<sub>5</sub> ceramics

### *Part I. Reaction sequence, microstructural analysis and microwave dielectric properties*

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In Part I, reaction sequence, microstructural analysis and microwave dielectric properties of Mn-doped BaTi<sub>4</sub>O<sub>9</sub> + ZnO + Ta<sub>2</sub>O<sub>5</sub> ceramics have been discussed. Above composition undergoes complex intermediate reactions during calcination. However final crystal phases after sintering process were identical regardless of calcination temperature. Meanwhile, the different calcination temperature affects the relative volume fractions of BaZn<sub>2</sub>Ti<sub>4</sub>O<sub>11</sub> phase, resulted in the variation of T<sub>f</sub> values. To analyze microstructure SEM, TEM and EDS analysis were performed. Mn dopants greatly enhanced the Q factor, up to 11,000 at 4.5GHz, whereas undoped ceramics indicated high loss perhaps due to the formation of Ti<sup>3+</sup> during the air atmosphere sintering.

(Key word : microwave dielectrics, dielectric constant, quality factor, dopant)