

## The effect of the $Y_2O_3$ concentration on the dielectric properties of thin-layer BME-X5R-MLCCs

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The demand for multilayer ceramic capacitors (MLCCs) with high volume capacities and the general trend towards further miniaturisation requires the application of thinner and thinner dielectric layers. In order to ensure good reliability this implicates the use of fine barium titanate, what, however, contradicts the capacity targets because of the reduced relative permittivity. Therefore, the importance of the dopants added to tune the properties of pure  $BaTiO_3$  is increased significantly. Among these additives  $Y_2O_3$  (or other rare earth element oxides like  $Dy_2O_3$  or  $Ho_2O_3$ ) – known as one of the “magic dopants” – plays a key role. In this work, the effect of the  $Y_2O_3$  content on dielectric properties in 50 layer MLCCs containing dielectric layers with an approximate thickness of  $3\mu m$  is investigated. The effects on the relative permittivity, the temperature coefficient of capacity, the isolation resistance and the reliability are studied comparing small and large signal response.