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## **Supplementary Informations:**

## Core-rim Structure Evolution and Electric Properties of Ca-Mg-Dy Co-

## doped BaTiO<sub>3</sub> Ceramics

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Figure S-1 (a) the BSE image of the raw BT powders and (b) the powder size distribution.



Figure S-2 BSE images of (a-c) BT4, (d-f) BT5, (g-i) BT6, (j-l) BT10, and (m-o) BT20 ceramics.



Figure S-3 The TEM images of the core-rim structured grain in (a)BT5 and (e)BT10 ceramics and their

EDS line scanning results of (b, f) Ca element, (c, g) Mg element, and (d, h) Dy element, respectively.



Figure S-4 (a) The BSE image of the secondary phase outlined by red dotted line and elemental mapping of (c) Ba, (d) O, (e) Mg, (f) Ti, (g) Ca, and (h) Dy in the sample BT5. (b) The ratio of second phase in BT samples.