



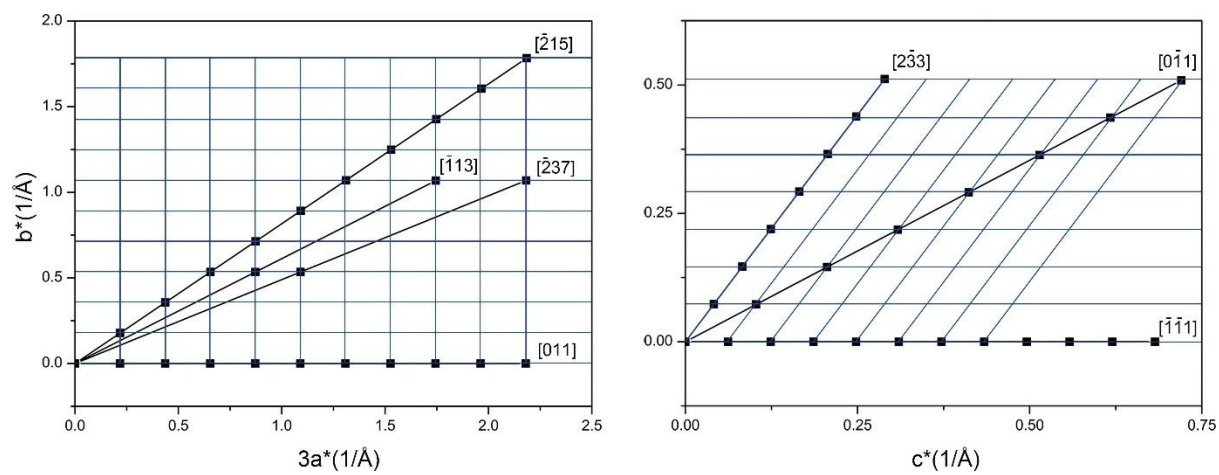
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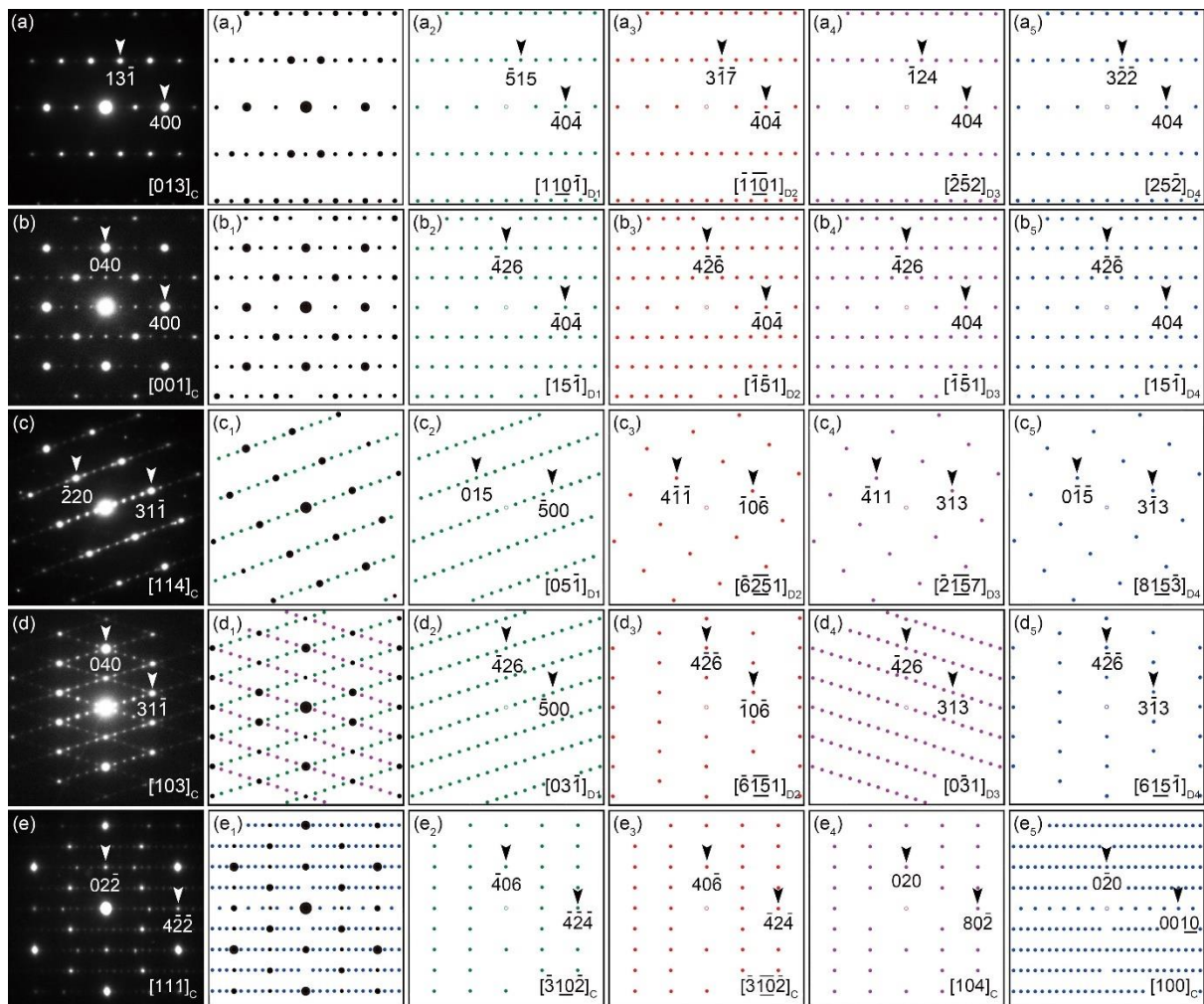
**Supporting information for article:**

**Orientation domains in a monoclinic Mg–Al–O phase**

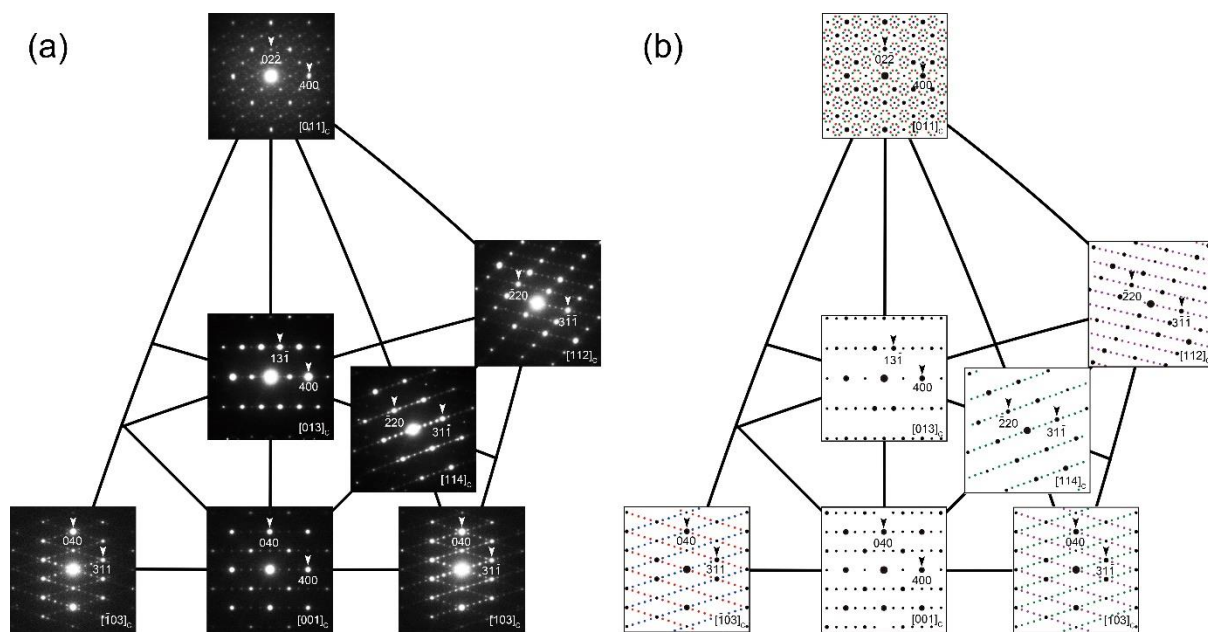
**Guangyu Wen, He Zheng, Kai Wang, Fan Cao, Ligong Zhao, Lei Li, Jianbo Wang and Shuangfeng Jia**



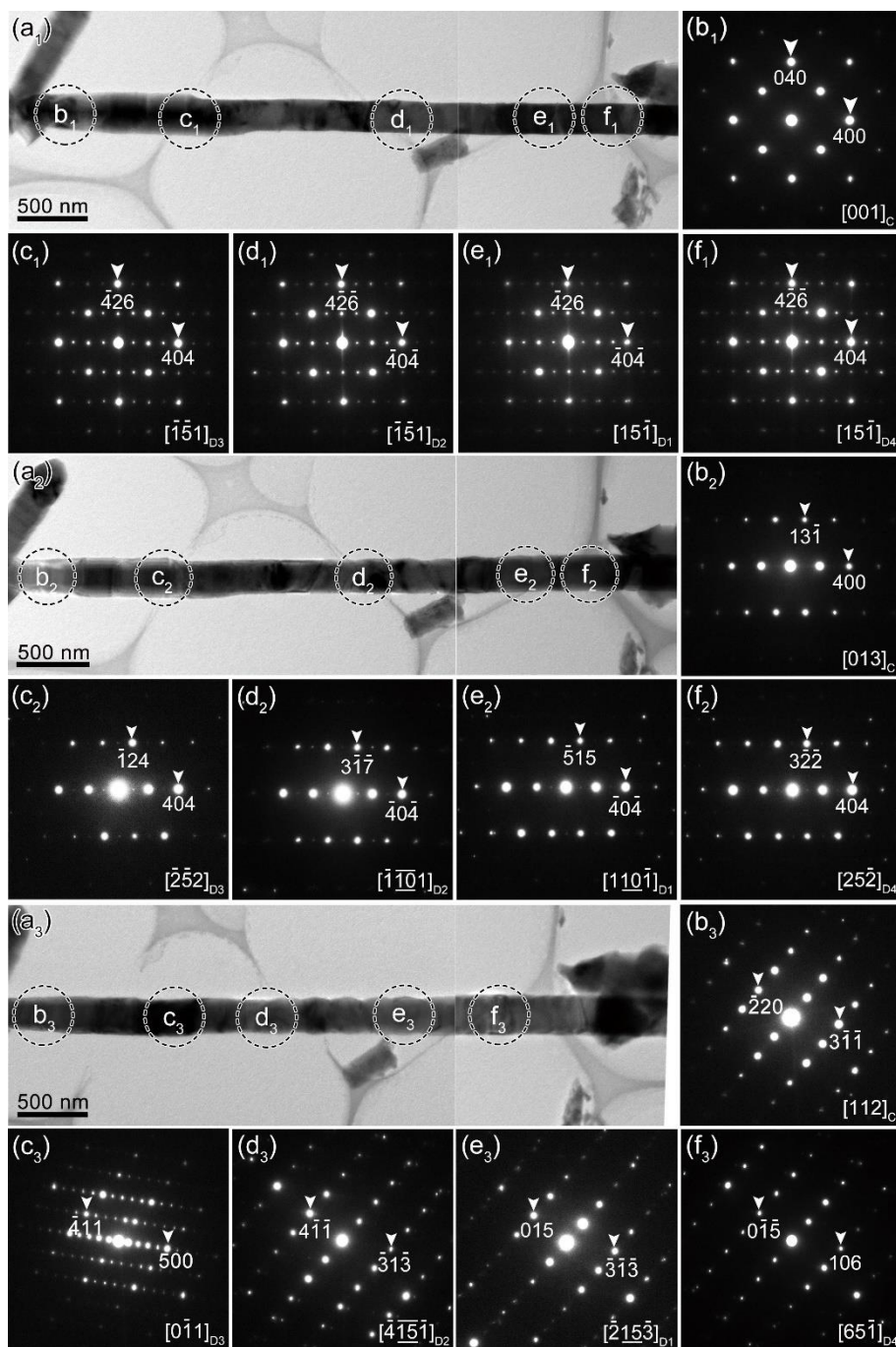
**Figure S1** Images of three-dimensional reconstruction of the reciprocal lattice.



**Figure S2** Experimental SAED patterns of  $[013]_c$  ,  $[001]_c$  ,  $[114]_c$  ,  $[103]_c$  ,  $[111]_c$  and the corresponding simulated patterns.

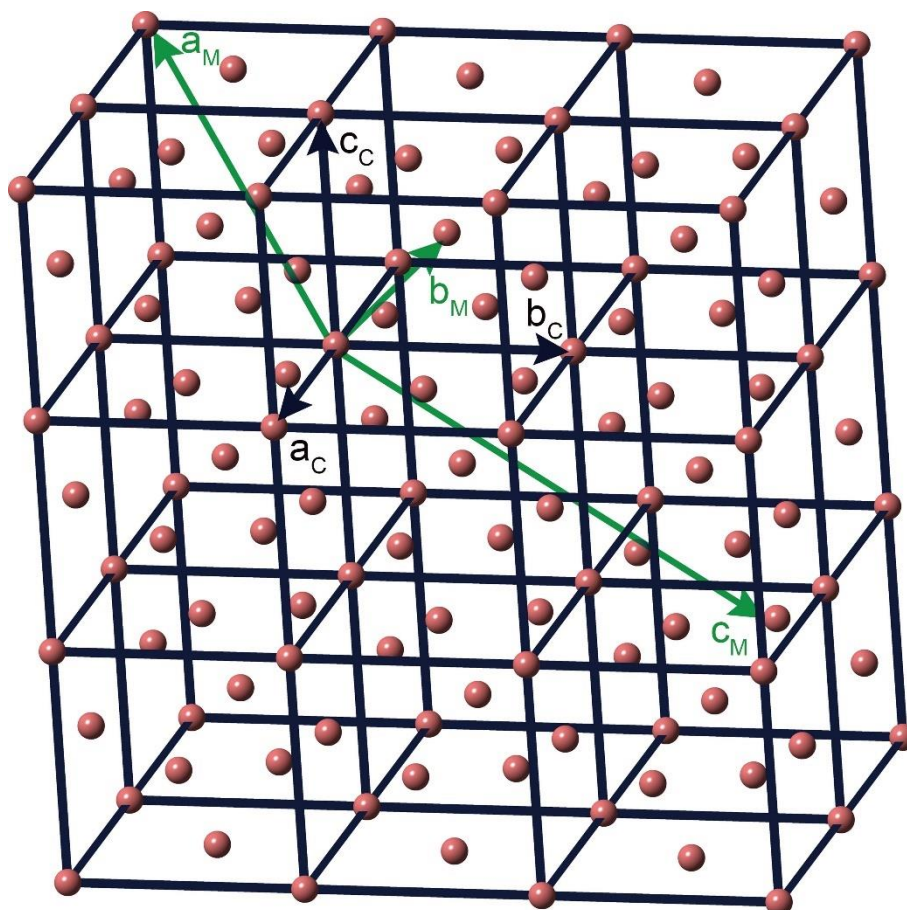


**Figure S3** (a) A series of experimental SAED patterns. (b) Corresponding simulated patterns.

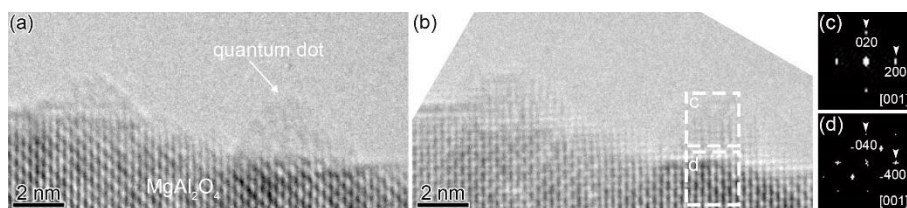


**Figure S4** (a<sub>1</sub>-a<sub>3</sub>) BF images of the same NW shown in Figure 6 along the  $[001]_C$ ,  $[013]_C$ ,  $[112]_C$  separately. (b<sub>1</sub>-f<sub>1</sub>, b<sub>2</sub>-f<sub>2</sub>, b<sub>3</sub>-f<sub>3</sub>) The SAED patterns corresponding to the circled areas in BF images (a<sub>1</sub>-a<sub>3</sub>).





**Figure S5** The schematic diagram of orientation relationship between the cubic MgAl<sub>2</sub>O<sub>4</sub> phase and domain D<sub>1</sub>. The salmon spheres represent the lattice points of MgAl<sub>2</sub>O<sub>4</sub> phase.



**Figure S6** (a-b) The growth of quantum dots under e-beam irradiation. (c-d) Corresponding FFT patterns of the square area in (b), which can be indexed based on the rocksalt and spinel structures of MgAl<sub>2</sub>O<sub>4</sub>, respectively.