[QMS2020 invited talk]

Electric field driven octahedral rotation in Sr_2RuO_4

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One of the key goals in the research of perovskite transition metal oxides (TMOs) is to design and control their physical properties, for which MO_6 (M=transition metal) octahedron rotation (OR) is considered to be one of the key control parameters. We show that OR can be induced and thus be tuned with an electric field in Sr_2RuO_4. Originally rotated octahedra in the surface layer of Sr_2RuO_4 are restored to the bulk structure upon K dosing on the surface. Our theoretical investigation shows that OR in Sr_2RuO_4 originates from surface electric field which can be controlled via the screening effect of the overlaid K layer and that the variation of Sr-Sr vertical distance is responsible for the coupling between OR and electric field. Our finding raises a possibility for electric field control of physical properties through the variation of the OR angle even for non-piezoelectric materials.