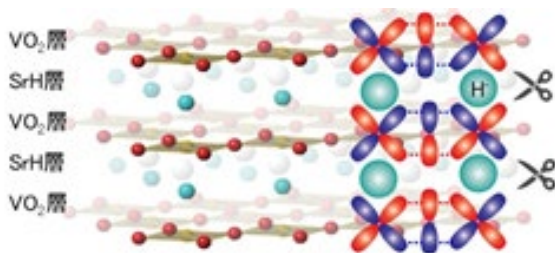
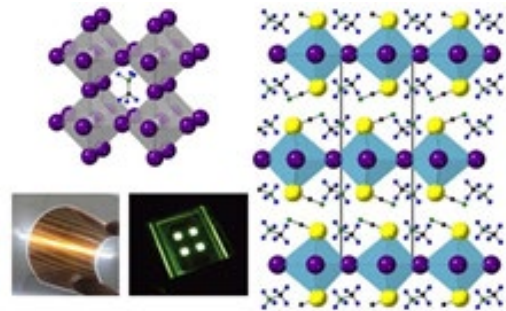


Investigation for functional materials beyond oxides

Oxide ceramics have various functionalities such as ferroelectricity in BaTiO_3 , redox ability for Li ion battery in LiCoO_2 , and superconductivity in cupric oxides. Many oxides have been synthesized in the research of inorganic chemistry so far, but oxide-based mixed-anion system that combine nitrogen (N^{3-}), fluorine (F^-), hydride (H^-), etc. have left room for investigation since it was difficult to synthesize and control the composition and structure. In our research, we are developing new materials that exceed the functionality of conventional oxides by using hard and soft reactions that allow to control the composition and structure of anion. We are also developing organic-inorganic hybrid materials to pursue functionality beyond conventional ceramics.



Oxyhydride SrVO_2H obtained by a soft chemical approach. Layered order of oxide ion (O^{2-}) and hydride ion (H^-) allow to realize quasi-two dimensional electronic state in SrVO_2H , where the H^- block the π bonding between the V $3d_{2g}$ orbitals (Nat. Commun. 2017).



Organic-inorganic hybrid materials, which have attracted great attention in the past decade due to their applications in emerging technologies, such as solar cell and LED.