Properties and applications of perovskite proton conductors

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A brief overview is given of the main types and principles of solid-state proton conductors with perovskite structure. Their properties are summarized in terms of the defect chemistry, proton transport and chemical stability. A good understanding of these subjects allows the manufacturing of compounds with the desired electrical properties, for application in renewable and sustainable energy devices. A few trends and highlights of the scientific advances are given for some classes of protonic conductors. Recent results and future prospect about these compounds are also evaluated. The high proton conductivity of barium cerate and zirconate based electrolytes lately reported in the literature has taken these compounds to a highlight position among the most studied conductor ceramic materials.

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