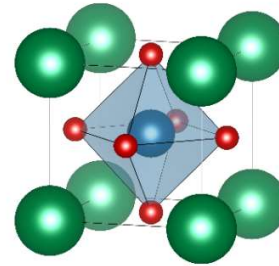


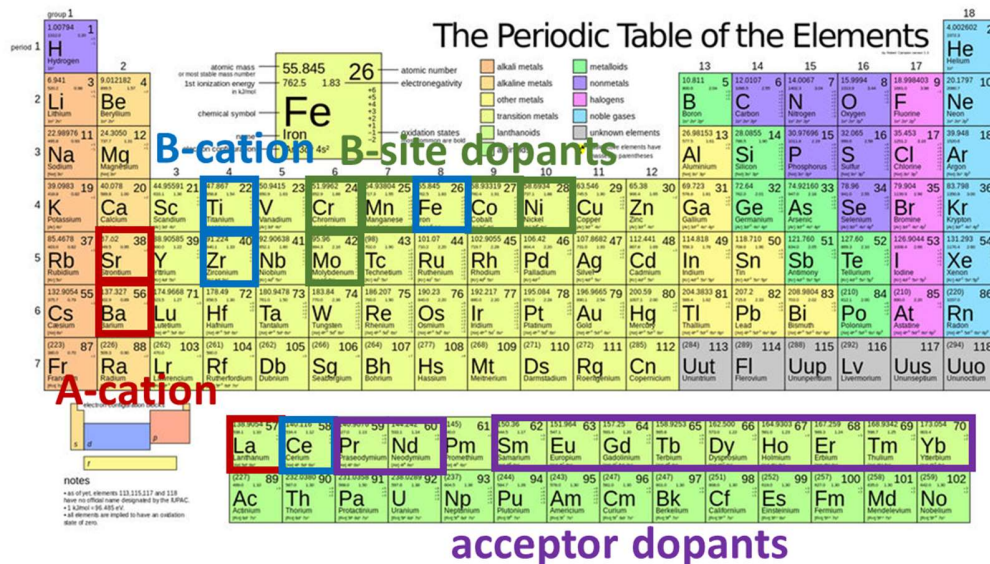
## Triple conducting oxides

Today's knowledge and development of energy conversion devices shows that hydrogen technologies may be an answer to the problem of the energy suitability. In the last decades the advances in developing the new energy sources like e.g. solid oxide fuel cells have been made but there is still a lot to do and to discover in this field. The answers for many nagging problems can be found in discovering of the new, better materials or revealing their new interesting properties. Therefore, we are aiming to find a completely new materials for solid oxide fuel cells, electrolyzers or/and batteries. The compounds we plan to investigate are mainly from the group of materials called perovskites. Perovskites are compounds with the specific cubic structure, and having general chemical formula of  $ABO_3$  (see Figure 1). What we want to find within this compounds are the materials which can conduct at the same time three different species, namely: oxygen ions, protons (hydrogen ions) and electrons. Finding such materials will allow developing better devices for energy conversion. We will be looking for the materials from a group of perovskites constituted from the elements that will ensure conduction of the at least two different species and by modification we will introduce another one. The possible constituent elements one can find depicted in Fig. 2.



**Figure 1** Unit cell of the perovskite structure  $ABO_3$

[K. Momma and F. Izumi, J. Appl. Crystallogr., 44, 1272-1276 \(2011\).](https://doi.org/10.1080/00036811.2011.61272-1276)



**Figure 2** The possible constituent elements to be used in the project.  
[https://commons.wikimedia.org/wiki/File:Periodic\\_table\\_large.svg](https://commons.wikimedia.org/wiki/File:Periodic_table_large.svg)