Recent years have witnessed an unprecedented progress in using hybrid organic-inorganic perovskites (HOIPs) for solar power conversion devices. Perovskite based solar cells reached record power conversion efficiency of 23% that closely matches or even exceeds the efficiencies of all the other, much more mature, thin film technologies including CdTe and CIGS. It has been recognized very early that the origin of the remarkable performance of HOIPs based solar cells is intimately related to the defect properties of these materials. In this project we hypothesize that the bistable nature of the amphoteric defects will greatly affect the dynamics and the transport of photoexcited electrons and holes in this material system. We anticipate that these beneficial properties of amphoteric defects will provide an entirely new, comprehensive explanation for the extraordinary performance of HOIP based photovoltaic devices. In order to verify this hypothesis we are going to perform systematic experimental studied of HOIP of various stoichiometry by advanced electrical and optical methods. The proposed research will be performed in a scientific consortium of Saule Research Institute (SRI) and Wroclaw University of Science and Technology (WUST). The SRI's expertise in perovskite material synthesis and device fabrication combined with WUSTs broad range of top of the line experimental methods to evaluate optical and electrical properties of these materials provide solid foundations for a successful realization of the project objectives.