Machine Learning-Based Pb Replacements for Perovskite Solar

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The quest for efficient and environmentally friendly alternatives in the field of solar energy has led to an expanding interest in perovskite solar cells. This research explores the synthesis and optimization of perovskite materials as lead (Pb) replacements, addressing the environmental concerns associated with traditional formulations. The study comprehensively explores the intricacies of perovskite solar cells, covering fundamental concepts such as perovskite structure, influencing factors, and the essential principles of machine learning. In pursuit of sustainable alternatives, the project defines three pivotal target factors: the formability of perovskite materials, their band gap properties, and their efficiency when integrated into solar cells. Utilizing machine learning methodologies, the research employs diverse algorithms to predict and optimize these critical factors. The application of machine learning facilitates a systematic exploration of the vast parameter space, enabling the identification of novel perovskite formulations with enhanced properties.

By harnessing the power of machine learning, this research contributes to the advancement of eco-friendly energy solutions, offering valuable insights for the sustainable evolution of perovskite solar cell technology. The findings hold significant implications for the renewable energy sector, guiding future strategies towards more environmentally conscious and efficient solar power solutions.

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