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| **Abstract:** |  |
| Given the increasing demand for electricity due to modernization and population growth, there is an urgent need to develop renewable energy conversion technologies such as photovoltaics. Among these technologies, CsPbIBr2, an all-inorganic lead halide-based perovskite, has shown promise due to its thermal stability, phase stability, and ease of fabrication. However, challenges remain, particularly in addressing device hysteresis and stability. Novel materials and optimized device designs could help overcome these challenges. This comprehensive review discusses strategies such as interface engineering, film quality improvement, compositional engineering, defect passivation, band alignments, and metal ion doping to enhance the performance of CsPbIBr2-based perovskite films and, in turn, their potential for photovoltaic applications. | |