**报告二题目：** High-Efficiency and Stable Perovskite Solar Cells and Modules

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**报 告 摘 要：**

"Perovskite solar cells (PSCs) have been attracting growing attention in the past few years due to the rapid rise in their power conversion efficiencies (PCEs) from 3.8 to 26%.1As the PCE is approaching the theoretical maximum, the most crucial issue concerns long-term stability which is still a major concern and represents a major bottleneck to commercialization.To overcome these problems, numerous techniques have been developed. On the one hand, we used cesium chloride (CsCl) and lead bromide (PbBr2) to stabilize the black phase (α-phase) in the double-cation (Cs, FA) perovskite system, achieving the better stability and performance for the methylammonium-free PSC device.2 On the other hand, ionic liquids (ILs), being non-volatile salts with high thermal stability, are attractive for a broad range of energy-related applications. we have designed and synthesized new functionalized ILs with Cl- and [TFSI]- anion, then a series of PSC devices employing the perovskite films prepared from the IL-precursor solutions were fabricated using n-i-p architecture. It is worth highlighting that the long-term stability of perovskite films has also revealed that the introduction of designed ILs is much helpful in enhancing the stability of perovskite solar cells and solar modules.3-5 In addition, 3D/2D PSCs are another prominent way to address these issues without compromising efficiency. Herein, we adopt the electron-donating methoxy (-OMe) group and halide substituted at -ortho, -meta, and -para positions on PEAI salts, resulting in significantly enhanced long-term, humidity and thermal stability.