## MS27-P02 | NEW RADIATION-INDUCED PHASE OF $MAPbI_3$ - AN UNEXPECTED SURPRISE OF SYNCHROTRON EXPERIMENTS.

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The last decade of photovoltaic research has been dominated by the rise of organic-inorganic hybrid perovskites (OHPs). Of all OHP variants $MAPbI_3$ has received the most attention from the photovoltaic community, this compound is composed of an organic cation, methylammonium (MA), within a post transition metal halide framework, lead iodide. These materials promise low-cost solution-processing with power conversion efficiencies approaching that of single-crystalline silicon devices at 23.7%. In spite of this OHP devices are yet to be proven commercially viable, this is in large part due to the chemical instability of the material under ambient conditions. This instability has been attributed to the volatile nature of the organic cation, uptake of $H_2O$, and formation of $I_2$.

One of the ways to improve the stability is to look for a more stable polymorphic modification that would retain the same photovoltaic properties. Single-crystal and powder synchrotron diffraction studies reveal a radiation-induced phase not reported before. Surprisingly though, a new phase was observed to emerge from the diffuse scattering after prolonged exposure to the synchrotron beam, the development of this phase appears to be correlated with the intrinsic diffuse scattering present in $MAPbI_3$. This new phase has since been stabilized through post synthesis treatment of $MAPbI_3$. Our observations show that X-ray radiation may be also considered as one more tool to engineer functional photovoltaic perovskites.