

Formamidinium doped CsSnI₃ perovskite for thermoelectric applications○ **Ajay Kumar Baranwal,¹ Shrikant Saini,² Tomohide Yabuki,² Qing Shen,¹ Koji Miyazaki,² Shuzi****Hayase¹****Univ. of Electro-Comm.¹, Kyushu Inst. Tech.²,****E-mail: ajaybaranwal@uec.ac.jp**

Halide perovskite materials (AMX_3 ; $A=CH_3NH_3^+$, $NH_2CHNH_2^+/FA^+$; $M=Pb^{2+}$, Sn^{2+} ; $X=I$) have found paramount attraction in thermoelectric study owing to ultra-low thermal conductivity, which appear because of rattling phenomenon of A-site, surrounded by MX_6 octahedra. The tuning of A-site cation alters the crystal packing density and the Gold-Smith tolerance factor would be influenced to mediate the electronic properties.

Inorganic $CsSnI_3$ crystal has been widely discussed recently due to promising thermoelectric applications owing to high electrical conductivity and ultra-low thermal conductivity. However, its poor tolerance factor (0.816) shows $CsSnI_3$ crystal is much strained. Here, we study the thermo-electric properties of perovskite crystal under the influence of tuning of A-site with large radius cation FA^+ . The A-site doping improves the tolerance factor, alters the electronic and thermoelectric properties of perovskite crystal. A series of $Cs_xFA_{1-x}SnI_3$ thin films have been fabricated and the resulting thermoelectric performance is studied. The details will be discussed in the conference.