Background:
Perovskites are a class of materials that have the structure of ABX$_3$, where A and B are cations and X is an anion. Many different cations can be embedded in this structure which allows the improvements of diverse engineered materials needed for different applications. 2-Dimensional Dion-Jacobson (DJ) perovskites have a layered structure with organic cations sandwiched between inorganic “n” amount of layers. The name Dion-Jacobson comes form the Dion-Jacobson phase.
- Perovskites offer a low-cost and high-efficiency prospects for solar power.
- The structure of 2D DJ perovskites have provide more resistance to environmental factors such as heat, moisture, and light.

Processing:
The process is as follows:
- Coating substrates with Nickel Oxide to increase the roughness of the surface.
- Pre-heating, spin coating with 2D $n$=4 with 4% PVP ink, and post-heating the substrates.

Aging Process:
- Samples were done according to the process.
- The microscope pictures and PL (photoluminescence) measurements were done before and after holding the samples in a dry glovebox and on a hot plate (at 85C) for 48 and 96 hour cycles.

Fracture Test Process:
- Samples were done according to the process but were layered with PMMA, silver, and epoxy respectively.
- Then they are put in the testing machine to simulate the outside affects by putting the samples in tensile and compressive cycles.
- This test shows how many cycles it would take for the samples to fracture over time, in the real world.

Fracture energy increased by >5X with the incorporation of PVP

From previous work done it can be seen that Propane-1,3-diammonium iodide with 4% PVP has the highest efficiency, which was the motivation to work on them during this experiment. (Gokce, Berrak)