

Lab #2

Due: One week after the last group's lab time

Lab 1 (Flexible Electronics)

We will continue using laser in lab #1 for the laser carbonization process and extending the process to the mechanical cutting scheme for Kirigami structures without using the conventional photolithography-based processes. A mechanical cutter is used to define complex resister patterns on designated material layers and/or cut through the layers by adjusting the applied force and speed. Please read through paper #7 carefully as lab #2 is based on the same process. TA will prepare the polymer samples and provide some guidelines for the operation of the mechanical cutter setup.

- (1) Go to 1113 Etcheverry at the time you sign up and take a photo of the specimen you are assigned before the synthesis process. You should ask TA on the specific dimensions, thickness ... of the specimen.
- (2) Under the guidance of TA, please place the sample into the laser setup and set the right parameters similar to paper #7 with a target to design a specific flexible electronics substrate/structure including both resister patterns and Kirigami structures as suggested by TA or to use your own design.
- (3) After the fabrication process, please move the sample out of the setup and take a photo for the sample after the fabrication process.
- (4) Measure the IV response of the resister under different deformation states. Bring a USB disc to copy the data or use your pen to write down the data.
- (5) Estimate the "gauge factor" of the device.
- (6) Write a short (1 page) report about this lab, including photos of the sample and IV response of resister under various deformations.
- (7) EXTRA POINTS: If you are interested in this lab, you can design and program your own patterns for specific purpose/application.