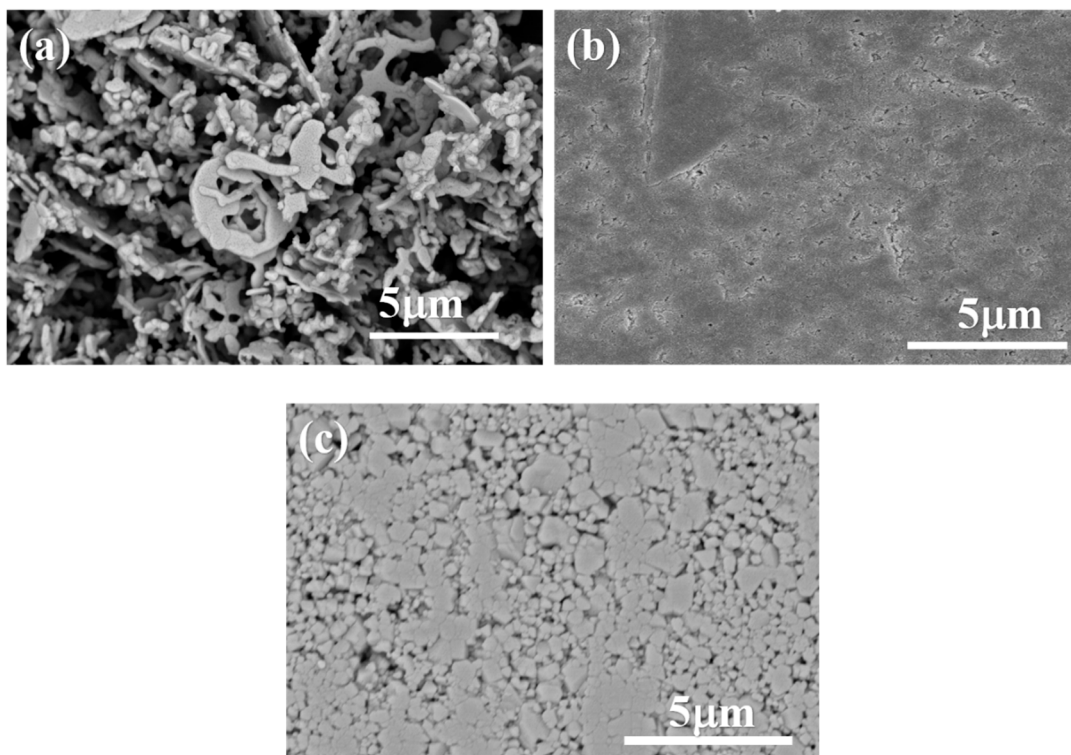


## Supporting Information

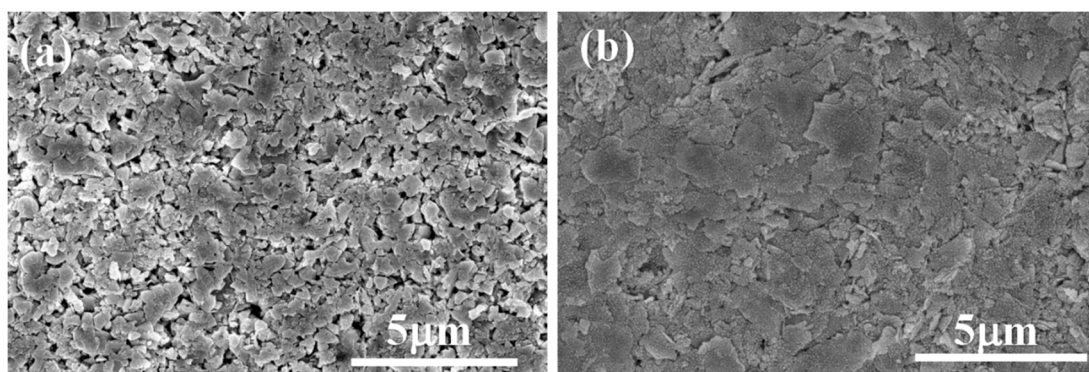
### Preparation and properties of flexible CuI/Polyvinylpyrrolidone composite thermoelectric film

Xiaowen Han, Xinru Zuo, Ying Liu, Zixing Wang, Kefeng Cai\*

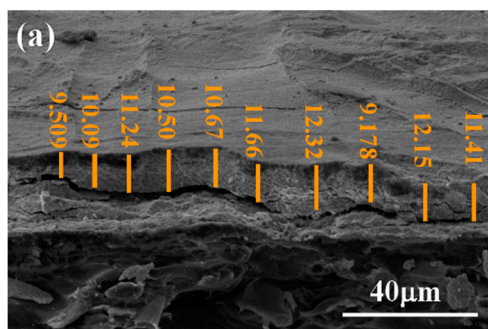
<sup>a</sup>Key Laboratory of Advanced Civil Engineering Materials of Ministry of Education, Shanghai Key Laboratory of Development and Application for Metal-Functional Materials, School of Materials Science & Engineering, Tongji University, 4800 Caoan Road, Shanghai 201804, China



**Fig. S1.** SEM images of (a) P0-powder, (b) P3-film, and (c) CuI film for last work<sup>[1]</sup>

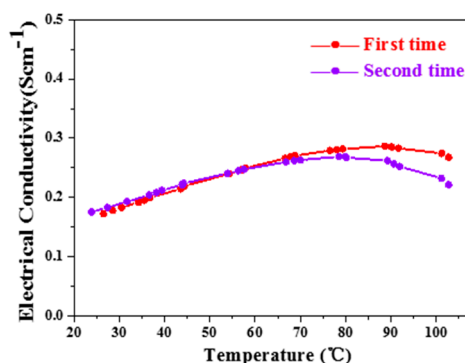


**Fig. S2.** Surface SEM images of (a) P1-film, and (b) P3-film (CP)

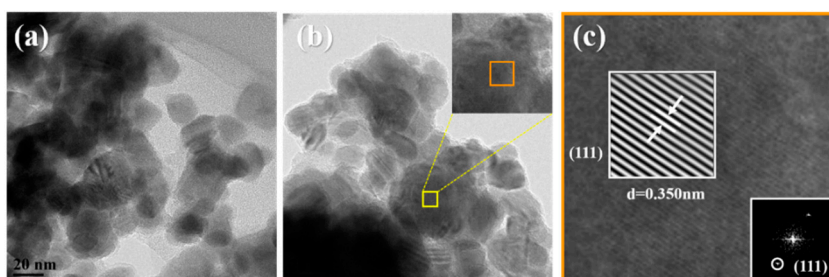


**Fig. S3.** A typical cross-sectional SEM image of the P1-film

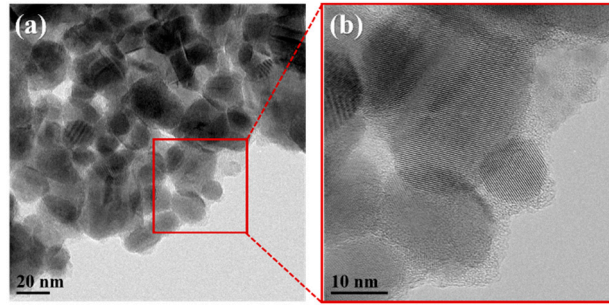
As the nylon membrane is soft and consists of many nylon fibers, if the composite film on nylon is cut directly with a knife, it will cause collapse of the structure, resulting in an uneven cross-section. Therefore, we use the following method to prepare the test sample. First, use a sharp knife to cut through the nylon but without the TE film; second, immerse the hybrid film in liquid nitrogen for one minute and then take it out; finally, fold the film along the scratch using a pair of tweezers to fully break the film.



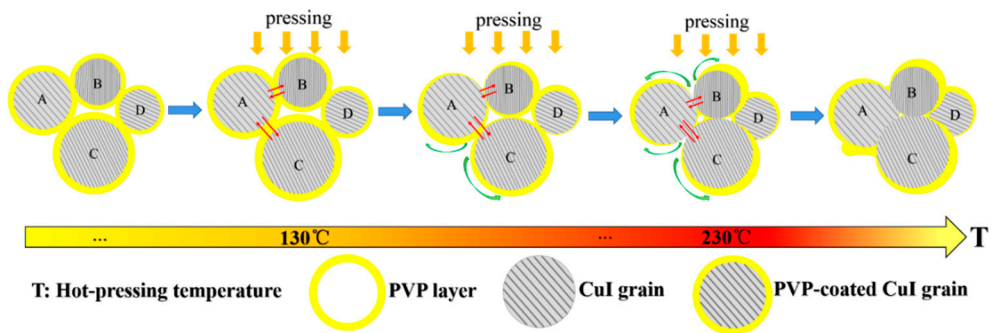
**Fig. S4.** Temperature-dependent electrical conductivity of P1-film for twice heating cycles.



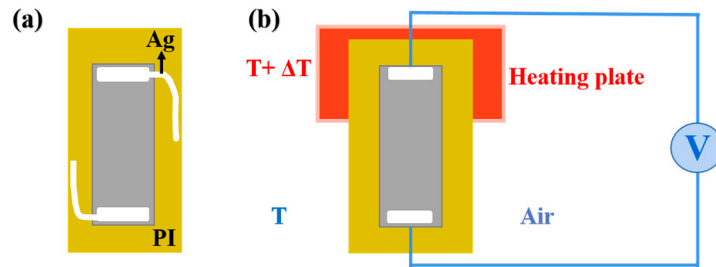
**Fig. S5.** TEM images of P1 powder (a,b), (c) HRTEM image corresponding to the orange rectangle marked in (b).



**Fig. S6.** TEM images of P1 film.



**Fig. S7.** Schematic illustration of CuI grain growth and PVP behavior with hot-pressing



**Fig. S8.** Schematic illustration of (a) a single-leg TE module, (b) a finger touch test on a single-leg TE module

## References

1. Han, X., et al., *CuI/Nylon Membrane Hybrid Film with Large Seebeck Effect*. Chinese Physics Letters, 2021. **38**(12).