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Solution manufacturing of 2D piezoelectric semiconductors for smart wearable devices YIXIU WANG, GANG QIU, PEIDE YE, WENZHUO WU, Purdue Univ — Due to two-dimensional (2D) nanomaterials, such as graphene and transition metal dichalcogenide (TMD) nanosheets, with single- or few-layer thickness have shown some extraordinary properties in contrast to their bulk counter parts. For example, some of the 2D nanomaterials exhibit layer-dependent bandgap. Besides, the high flexibility, ultrahigh surface area and good mechanical strength make them promising for electronics/optoelectronics and sensors. Here, we report a low-temperature, solution-based method to produce a new class of 2D piezoelectric semiconductors with controlled thickness and lateral dimensions at large scale. Such material shows non-centrosymmetric crystal structure, which enable us to not only explore its basic piezoelectric and semiconductor properties but also its application in wearable devices.

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