Title:	Stacking Engineered Room Temperature Ferroelectricity in Twisted Germanium Sulfide Nanowires
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Abstract:	Group-IV monochalcogenides have emerged with immense potential to be used as ferroelectric materials in recent times. However, in most of them, ferroelectricity is limited by the presence of inversion symmetry in their natural crystal structure. Here, an experimental observation of ferroelectric order at room temperature by introducing Eshelby twist in Germanium sulfide (GeS) nanowires is reported. The twisted nanowires are synthesized by low-pressure chemical vapor deposition. The existence of room temperature ferroelectricity in a single nanowire is confirmed by electrical measurements, piezoelectric force microscopy, and second harmonic generation spectroscopy. Density functional theory calculations reveal that the twist in the GeS nanowires breaks the inversion symmetry where the inversion symmetry breaking phonon modes get hardened giving rise to ferroelectricity. These results are expected to be useful in making non-volatile memory devices, flexible electronics, electronic sensors, and neuromorphic computing.
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