**Supplementary Information**

**Inducing Abundant Magnetic Phases and Enhancing Magnetic Stability by Edge Modifications and Physical Regulations for NiI\(_2\) Nanoribbons**

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**Fig. S1.** (a)Top view, (b) side view and magnetic ordering of bulk NiI\(_2\) atomic structure, in which the red dashed rhombus indicates the \(1\times1\) unit cell. (c) Band structure of bulk NiI\(_2\). (d) Band structure of NiI\(_2\) monolayer.
Fig. S2. Phonon dispersion for ZNiI$_2$NRs. (a) M0, (b) M5.

Fig. S3. Energy and temperature versus time profiles of nanoribbons in annealing molecular dynamics simulations. (a) M0, (b) M1, (c) M2, (d) M3, (e) M4, and (f) M5.
Fig. S4. For M3. (a) Averaged magnetic moment for whole ribbon and edged Ni and I atoms in the FM state versus strain, (b) edged atom bond lengths $d_1$, $d_2$, $d_3$, and $d_4$ versus strain, (c) edge atom bond angles $\theta_1$ and $\theta_2$ versus strain, (d) the band structure in the FM state versus strain, and (e) magnetic exchange energy $\Delta E$ and Curie temperature $T_C$ versus strain.