**Electronic Supplementary Information**

**Syntheses, structures, and thermoelectric properties of ternary tellurides: RECuTe₂ (RE = Tb–Er)**

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**Figure S1.** The refined powder XRD of TbCuTe2.

**Figure S2.** Spatial symmetry operation change from the LTP (P\(\bar{3}m1\)) to the HTP (P\(\bar{3}\)).
Figure S3. Temperature dependence of the thermal diffusivity for RECuTe$_2$ (Tb–Er).

Figure S4. DSC diagrams of RECuTe$_2$ (Tb–Er).
**Figure S5.** Thermal stability of thermoelectric transport parameters of TbCuTe$_2$ along the hot-pressed direction during two thermal cycles. (a) electrical conductivity ($\sigma$), (b) Seebeck coefficient ($S$), (c) total thermal conductivity ($\kappa_{\text{total}}$) and (d) $ZT$ value. The solid lines are a guide for the eyes.

**Figure S6.** The TGA curves for RECuTe$_2$ (RE = Tb, Dy, Ho, Er).