

## Supplementary Information

### **Nonlinear conduction and multifunctional integration enabled by segregated network modulation in PET@Ni composites**

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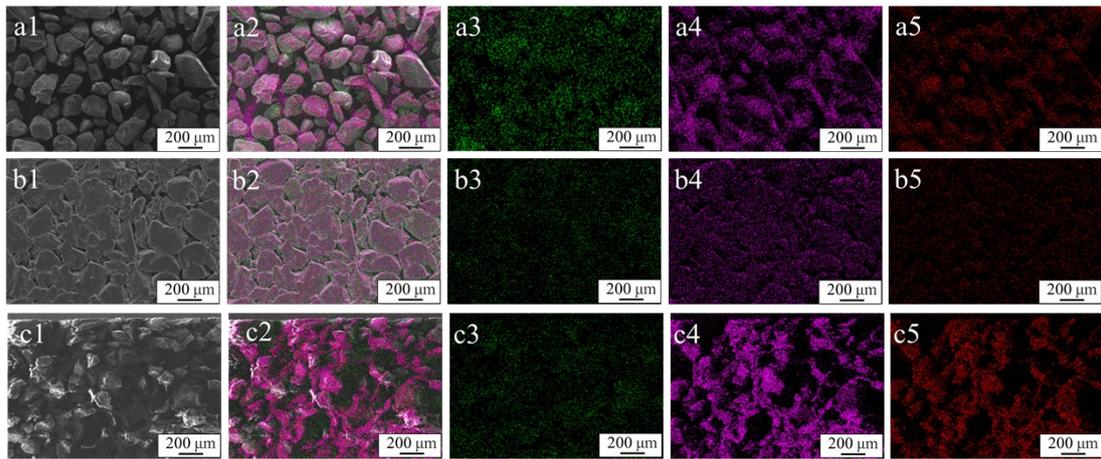
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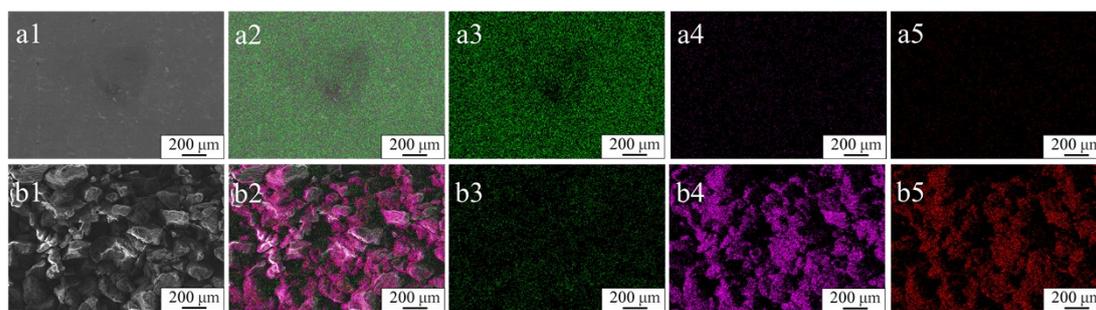
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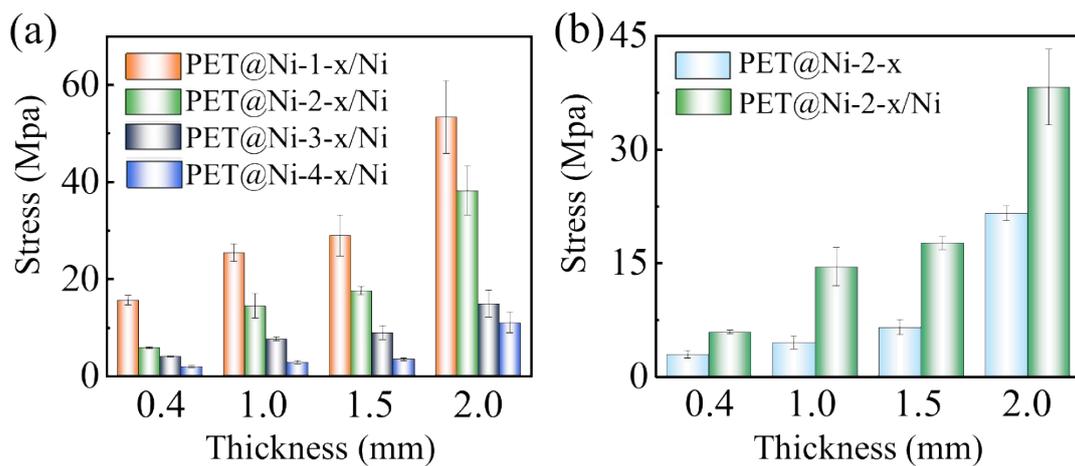
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**Fig. S1.** SEM images and corresponding EDS elemental mappings of PET@Ni-based samples before and after hot pressing. (a1–a5) PET@Ni-1 particles, (a1) SEM image, (a2) EDS overlay image, and elemental distribution maps of (a3) Ni, (a4) C, and (a5) O. (b1–b5) Surface morphology of PET@Ni-1-1.5 film after hot pressing, (b1) SEM image, (b2) EDS overlay image, and elemental maps of (b3) Ni, (b4) C, and (b5) O. (c1–c5) Cross-sectional morphology of PET@Ni-1-1.5 film, (c1) SEM image, (c2) EDS overlay image, and elemental maps of (c3) Ni, (c4) C, and (c5) O.



**Fig. S2.** SEM images and corresponding EDS elemental mappings of PET@Ni-1-1.5/Ni. (a1–a5) Surface morphology of PET@Ni-1-1.5/Ni composite film, (a1) SEM image, (a2) EDS overlay image, and elemental maps of (a3) Ni, (a4) C, and (a5) O. (b1–b5) Cross-sectional morphology of PET@Ni-1-1.5/Ni composite film, (b1) SEM image, (b2) EDS overlay image, and elemental maps of (b3) Ni, (b4) C, and (b5) O.



**Fig. S3.** (a) Tensile strength of PET@Ni/Ni composite films as a function of film thickness for different PET particle sizes. (b) Comparison of the tensile strength of PET@Ni-2-x films before and after secondary Ni plating at different thicknesses.