**Supporting Information**

# Porous copper-graphene heterostructures for cooling of electronic devices

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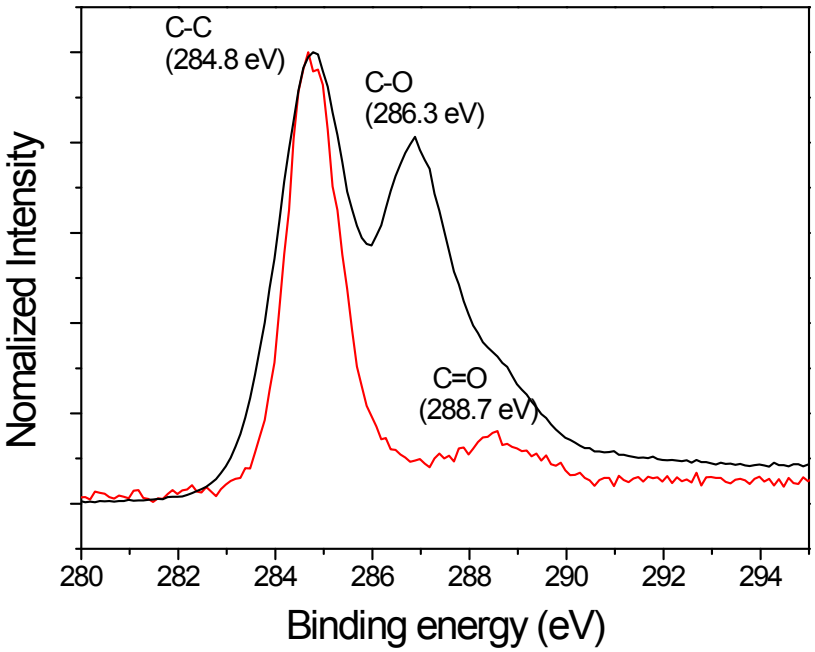
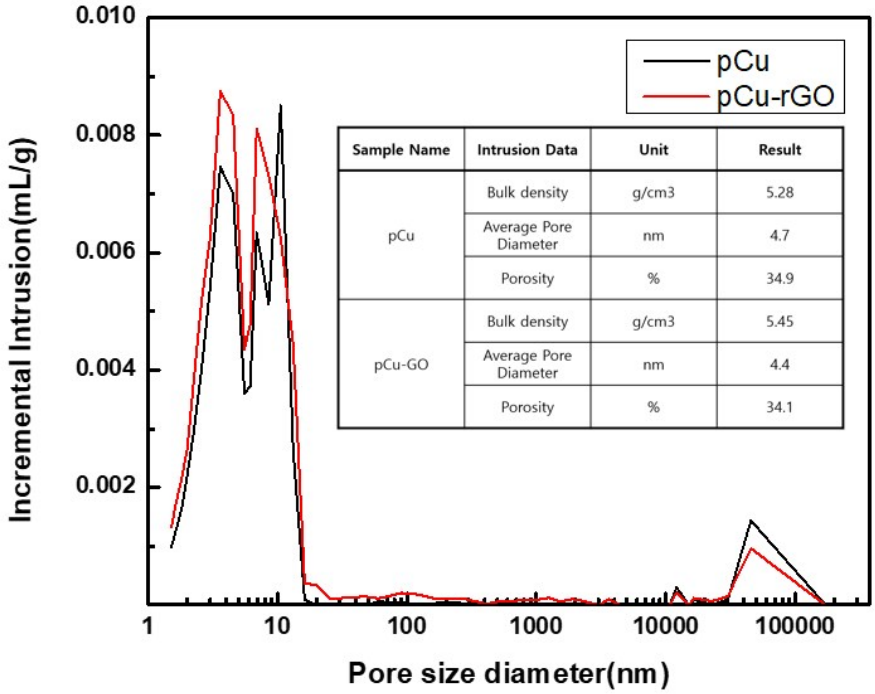



**Figure S1. C1 XPS spectra of Cu and GO mixture before (black) and after (red) thermal treatment at 1000 °C.**




| Sample Name | Intrusion Data | Unit | Result |
|---|---|---|---|
| pCu | Bulk density | g/cm3 | 5.28 |
| | Average Pore Diameter | nm | 4.7 |
| | Porosity | % | 34.9 |
| pCu-GO | Bulk density | g/cm3 | 5.45 |
| | Average Pore Diameter | nm | 4.4 |
| | Porosity | % | 34.1 |

**Figure S2. BET of pCu and pCu-rGO.**

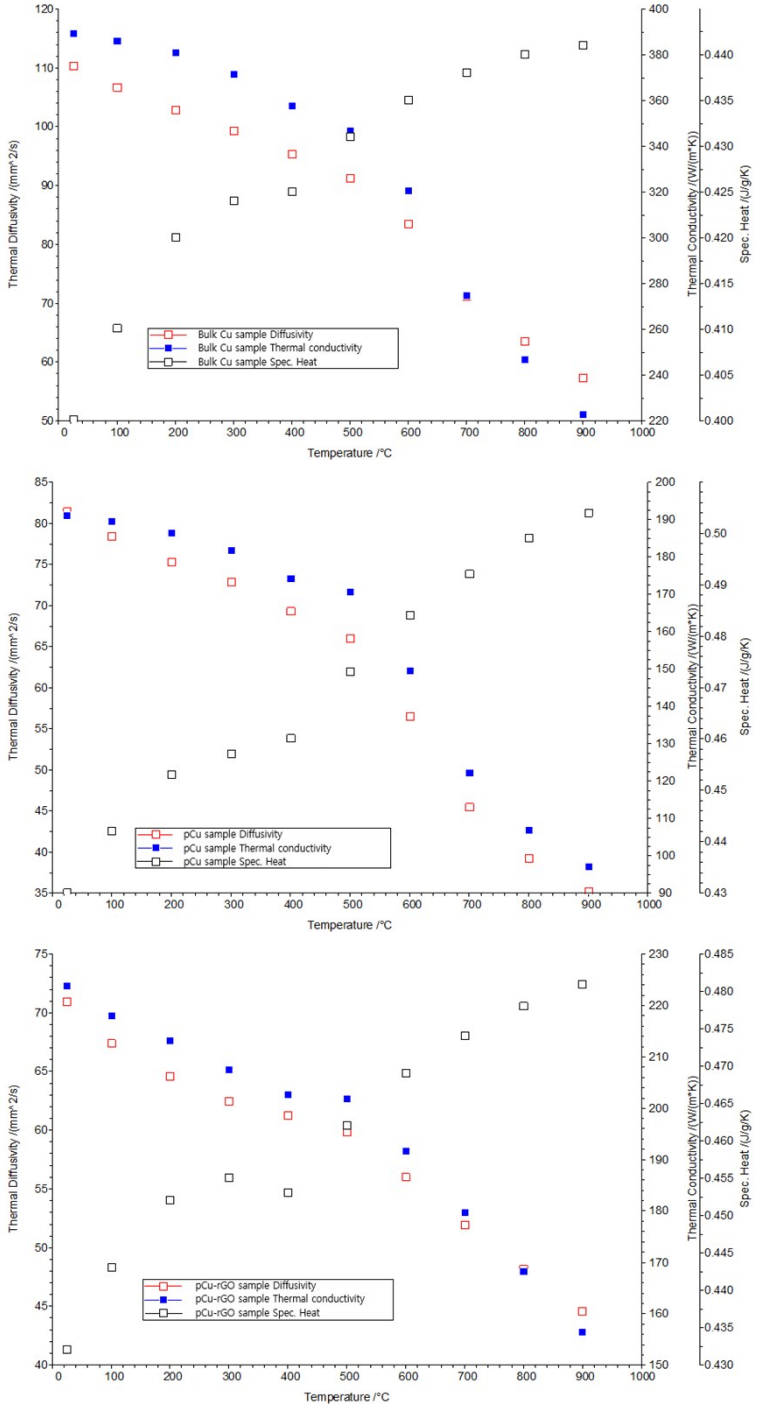



**Figure S3. Thermal diffusivity, heat capacity and calculated thermal conductivity of bulk Cu(top), pCu(mid) and pCu-rGO(bottom) .**

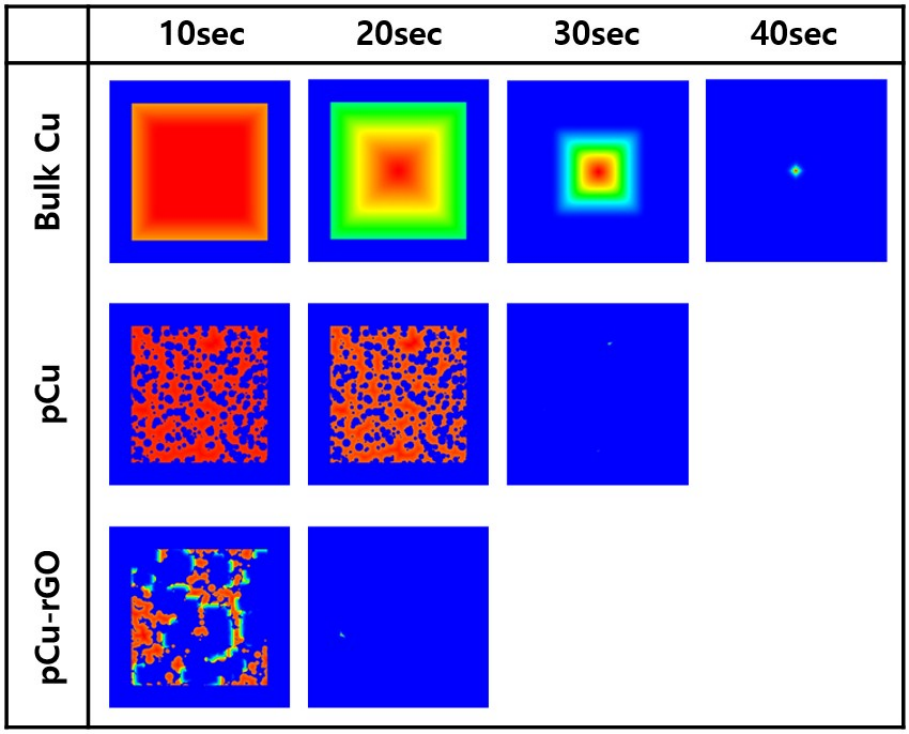



**Figure S4. Simulated temperature distribution by convection heat transfer based on cellular energy-transport model.** (top) bulk Cu, (mid) pCu, and (bottom) pCu-rGO with saturated at100 °C was naturally cooled down for same time at room temperature (20°C). Analysis model consists of three domains including air, rGO, and copper. Heat transferred by convection can be calculated using the equation; $Q = H_c \times A \times \Delta T/d \times t$ , where Q is the provided heat, *Hc* is the convection heat transfer coefficient, *A* is the cross sectional area, *T* is the temperature difference, and *d* is the thickness of material.