Supporting Information

Investigation of the thermal conductivity of resin-based lightweight composites filled with hollow glass microspheres

Zhipeng Xing, Hongjun Ke, Xiaodong Wang*, Ting Zheng*, Yingjie Qiao, Kaixuan Chen, Xiaohong Zhang, Lili Zhang, Chengying Bai, Zhaoran Li

School of Material Science and Chemical Engineering, Harbin Engineering University, Harbin 150001, China.

Corresponding author: wangxiaodong@hrbeu.edu.cn (X.Wang);
tingzheng@hrbeu.edu.cn (T. Zheng)

Table S1 The properties of HGMs

| Type | Diameter /μm | Density /g·cm⁻³ | Compressive strength /MPa |
|------|-------------|-----------------|--------------------------|
| D30  | 30          | 0.60            | 68.9                     |
| D40  | 40          | 0.38            | 30.0                     |
| D55  | 55          | 0.15            | 2.1                      |
### Table S2: Constitutive design of HGM/EP LWTI composites

| HGMs  | E-51  | Hardener | HGM Diameter |
|-------|-------|----------|--------------|
| /vol.%| /vol.%| /vol.%   | 30 μm        |
|       |       |          | 40 μm        |
|       |       |          | 55 μm        |
| 20%   | 64%   | 16%      | D30-20       |
| 30%   | 56%   | 14%      | D30-30       |
| 40%   | 48%   | 12%      | D30-40       |
| 50%   | 40%   | 10%      | D30-50       |

### Table S3: Symbols in model derivation

| Symbols | Physical Meaning                          | Unit   |
|---------|------------------------------------------|--------|
| $T$     | Temperature                               | °C     |
| $r$     | Polar Radius                              | μm     |
| $\theta$| Polar Angle                               |        |
| $\alpha$| Temperature Gradient in Composite        |        |
| $h_{2i}$| Thermal Resistance of the Interface Contact between HGMs and Matrix resin | (m²·K)/W|
| $v_n$   | the Volume Fraction of the nth Material in the Unit |        |
| $\beta_n$| Contact Thermal Resistance                 | (m²·K)/W|
| $v_f$   | the Volume Fraction of HGMs               |        |
| $\delta$| the Wall Thickness of HGMs                | m      |
| $q$     | Heat Flow                                 | (W/m²) |