# Supplementary Information

## Modeling the effect of chirality on thermal transport in pillared-graphene structure

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To calculate thermal conductivity along the graphene plane direction, we used the following relation,

$$k_{\parallel} = \frac{Q/A\Delta t}{dT/dx}$$

Here, $Q$ is heat flow, $A$ is $4L_y$ times van-der-waals thickness (3.34 Å), $\Delta t$ represents the time at which heat is flowing and $dT/dx$ is the temperature gradient along $x$ direction. From the following relation, the TBC along the graphene direction can be calculated as

$$G_{\parallel} = \frac{Q}{A\Delta T}$$

Here $\Delta T$ represents a temperature drop due to the presence of the interface. The temperature distribution along the graphene direction is shown in Fig.S4.

Table S1. Details of the unit cell considered to generate the zig-zag PG with different pillar chirality (m,n). Here $L_x$, $L_y$ and $L_z$ are the unit cell dimension in Å and $N$ is the number of atoms per unit cell. The pillar length is 36 Å.

| (m,n) | $L_x$ | $L_y$ | $L_z$ | N |
|---|---|---|---|---|
| (8,0) | 23.3 | 24.1 | 35.2 | 684 |
| (10,0) | | | 35.6 | 728 |
| (12,0) | | | 36.1 | 768 |
| (14,0) | | | 36.1 | 808 |

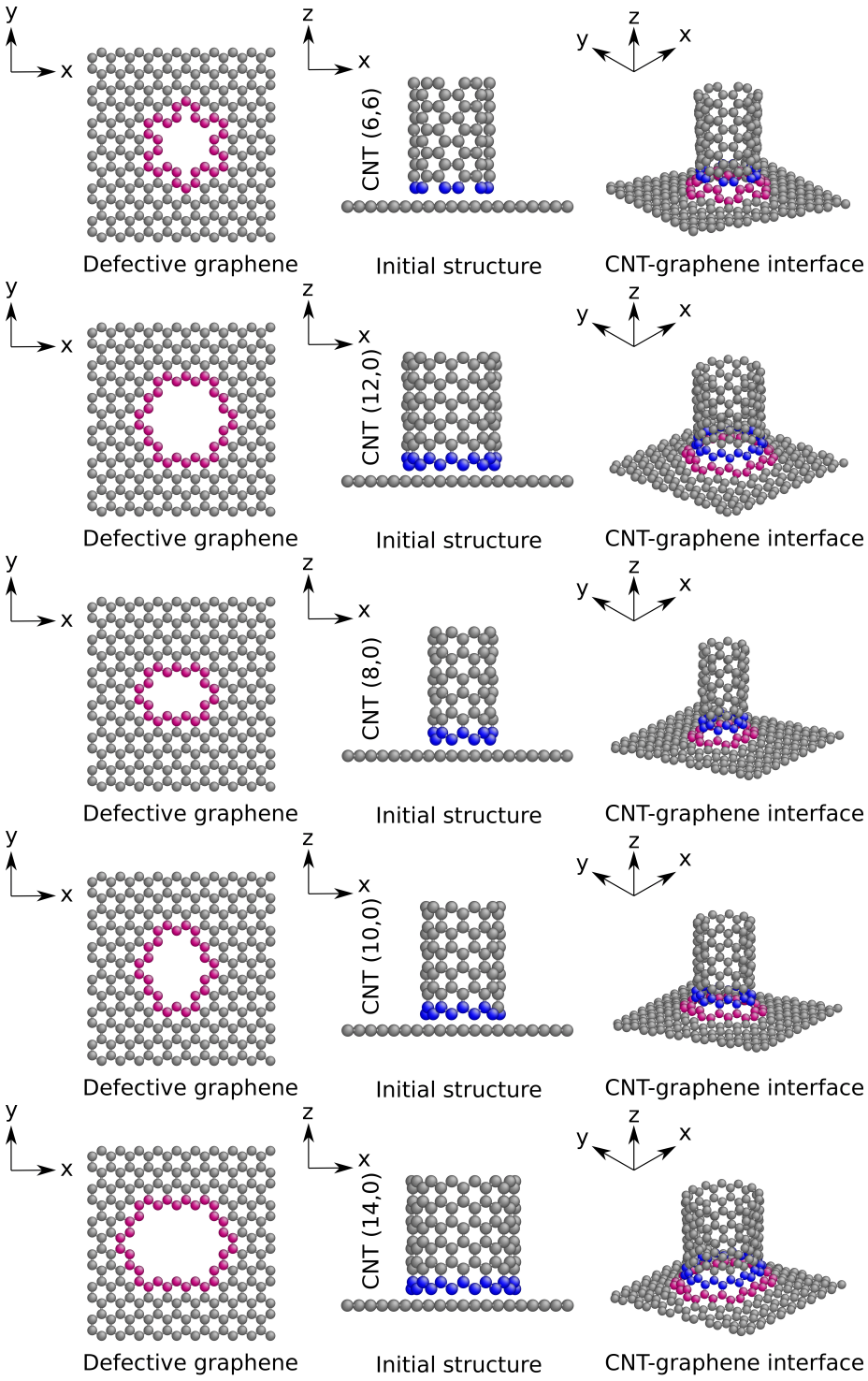


Fig S1. Optimized CNT-graphene interfaces constructed with different CNT chirality.

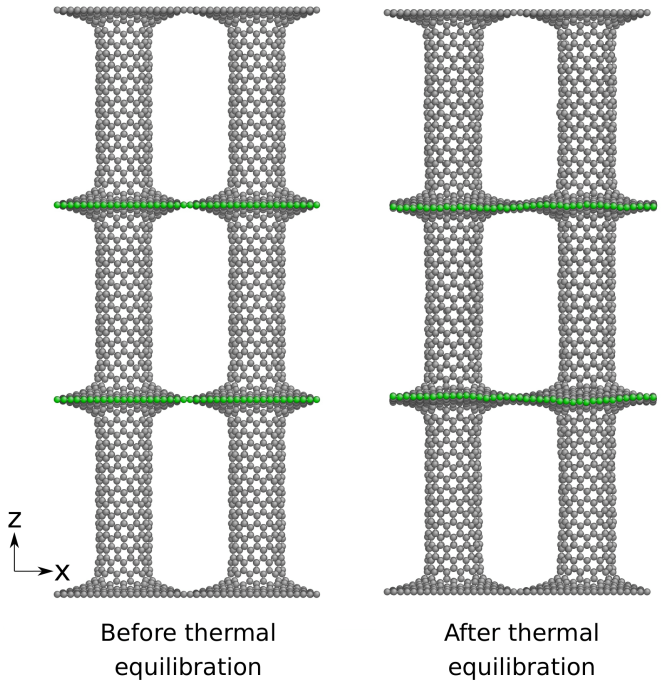


Fig S2. The zig-zag PG system before and after the thermal equilibration process. Moderate deformation is observed in the graphene layer due to the presence of topology defects. The edges of the graphene atoms are highlighted in green.

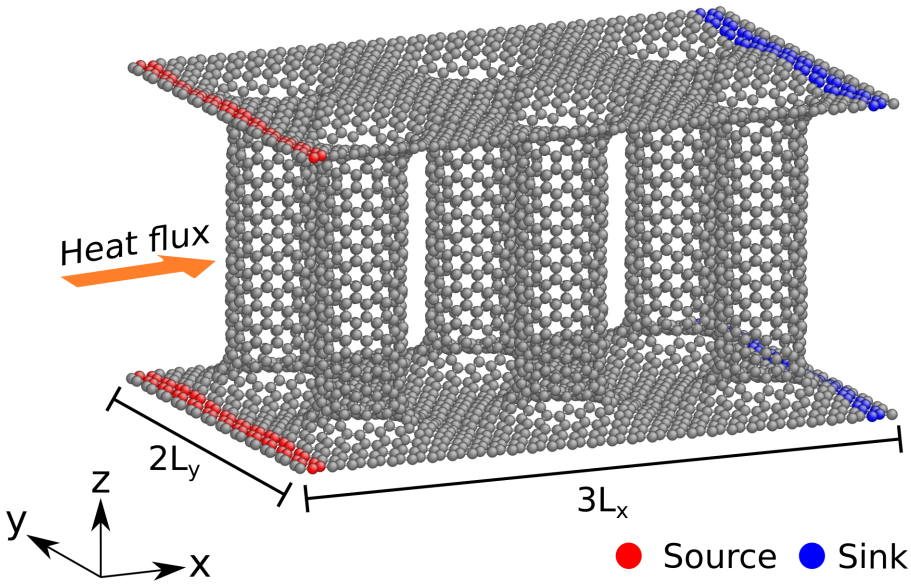


Fig S3. Pillared graphene system when the heat is transported along graphene direction. Here the heat source and sink are highlighted in red and blue color respectively. Totally six unit cells are considered for this numerical simulation.

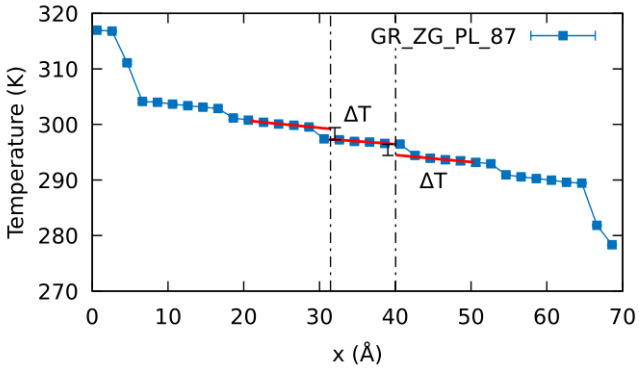


Fig S4. Temperature distribution along the graphene direction.

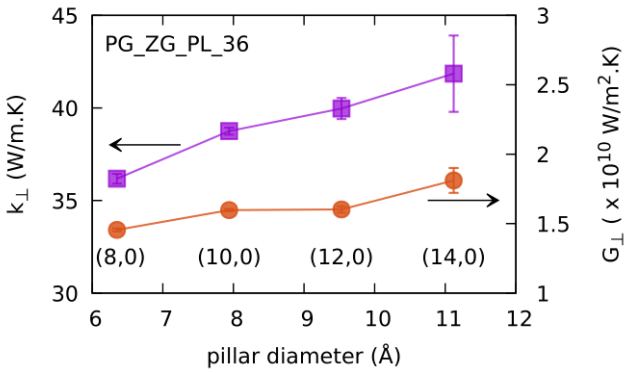


Fig S5. Effect of pillar diameter in the zig-zag PG system.