Supplemental Material for "Thermal Transport and Thermal Spin Transport of Step-like Graphene Nanoribbon Junctions"

Xingyi Tan[a], Lili Liu[a], Gui-Fang Du[b] and Hua-Hua Fu[*b]

[a]Department of Physics, Chongqing Three Gorges University, Wanzhou, 404100, People's Republic of China.

[b]School of Physics and Wuhan National High Magnetic Field Center, Huazhong University of Science and Technology, Wuhan 430074, People's Republic of China

*E-mail: hhfu@hust.edu.cn
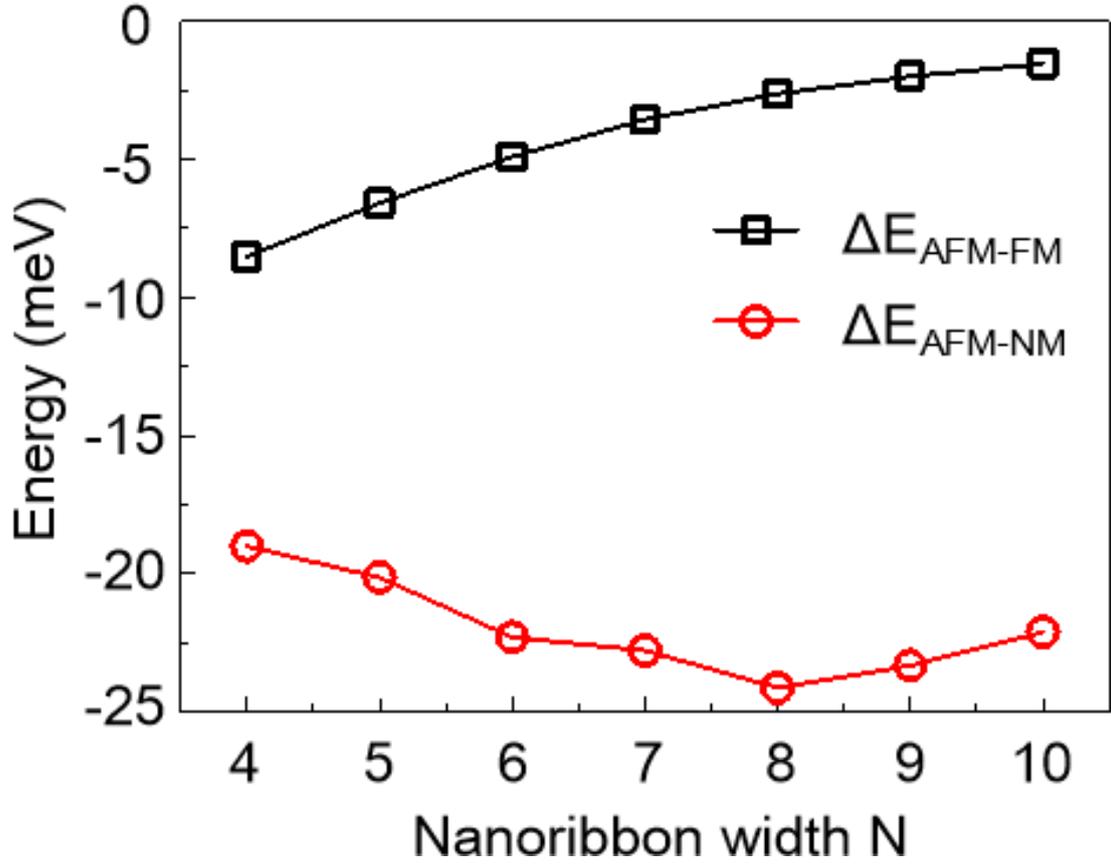
Fig. S1. The calculated values of the energy difference $\Delta E_{AFM\text{-}FM}$ (= E_{AFM} − E_{FM}) and $\Delta E_{AFM\text{-}NM}$ (=E_{AFM} − E_{NM}) for the parallel step-like GNR junctions with the different magnetic states, where E_{AFM}, E_{FM} and E_{NM} denote the energy of the AFM, FM and NM state, respectively. Here, the nanoribbon width N in the right part of the GNR junctions is changed from 4 to 10.
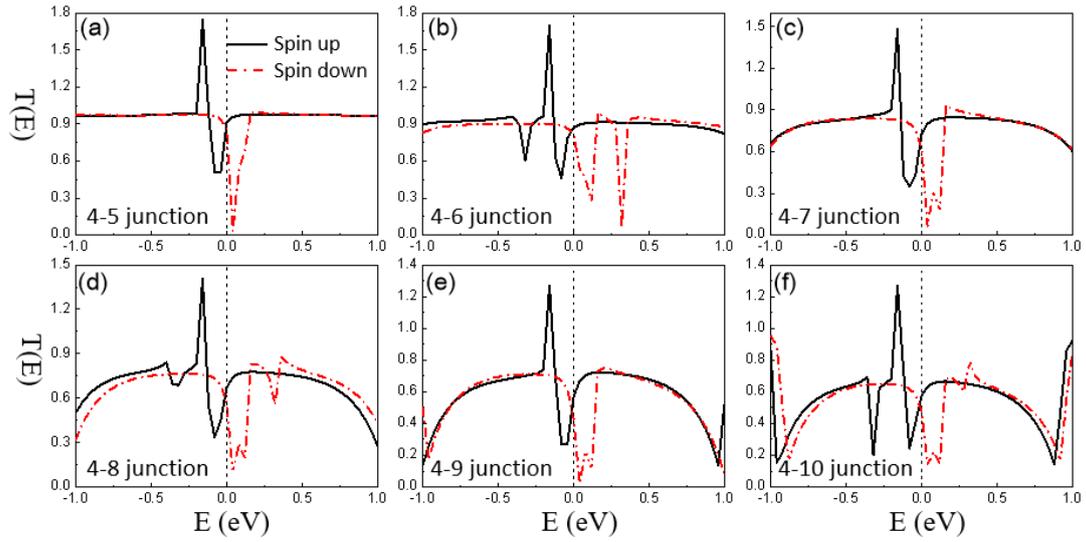
Fig. S2. The spin-dependent transmission spectra T(E). The black line (red dotted line) illustrates the flowing direction of the spin-up (spin-down) transmission spectra, respectively, where the transmission is united by e^2/h. The figures (a)-(f) describe the numerical results for the GNR junctions from 4-5 to 4-10, respectively.
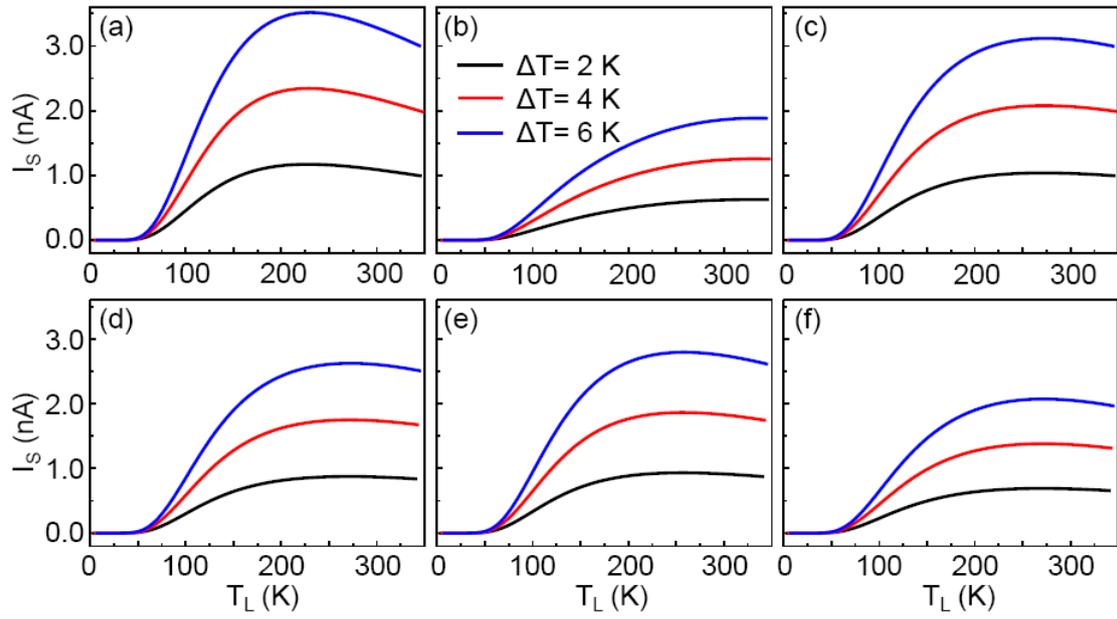
Fig. S3. The thermally driven net spin-dependent currents ($I_s = I_{up} - I_{dn}$) as a function of the temperature T_L, where the temperature gradient ΔT (= $T_L - T_R$) is set as 2, 4, 6 K. The figures (a)-(f) describe the numerical results for the GNR junctions from 4-5 to 4-10, respectively.