Table S1. The table summarizes the $I_D/I_G$ ratio for pSLG and fSLG, and defect density for fSLG. Values are relative to six graphene samples and represent measurements performed before the chemical functionalization (pSLG, grey column) and after (fSLG, red column).

| Sample | $I_D/I_G$ (pSLG) | $I_D/I_G$ (fSLG) | $\Delta I_D/I_G$ | $nD$ (cm$^{-2}$) |
|--------|-----------------|-----------------|-----------------|-----------------|
| 1      | 0.04            | 0.33            | 0.29            | 6.52 x 10$^{10}$ |
| 2      | 0.05            | 0.23            | 0.18            | 4.04 x 10$^{10}$ |
| 3      | 0.03            | 0.19            | 0.16            | 3.60 x 10$^{10}$ |
| 4      | 0.03            | 0.23            | 0.20            | 4.49 x 10$^{10}$ |
| 5      | 0.08            | 0.15            | 0.07            | 1.57 x 10$^{10}$ |
| 6      | 0.05            | 0.32            | 0.27            | 6.07 x 10$^{10}$ |