Supporting Information for:

Dimensional Anisotropic Graphene with High Mobility and High On-Off Ratio in three-terminal RRAM device

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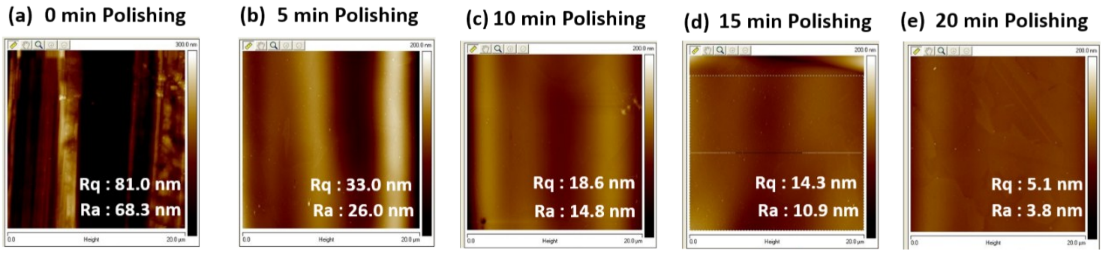

Figure S1, AFM images of the Cu foil (20 μm× 20 μm) surface morphologies after 0 min (a), 5 min (b), 10 min (c), 15 min (d), and 20 min (e) of electrochemical polishing. The electrochemical polishing platform and process are illustrated in Figure 2 (c-e).

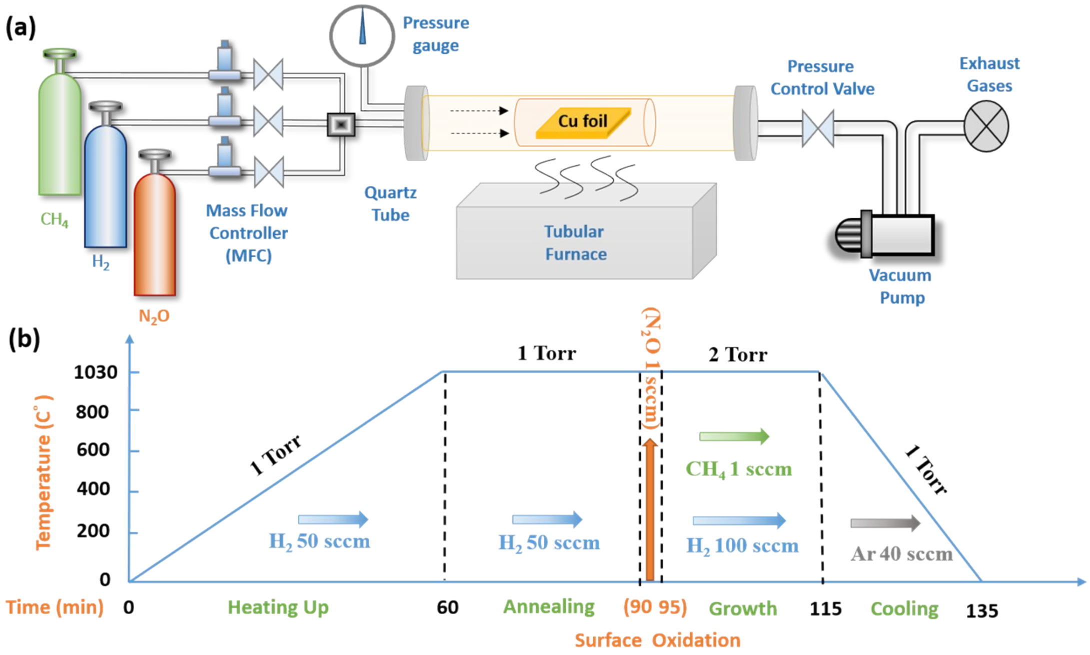

Figure S2, Illustration (a) and growth parameters (b) of chemical vapor deposition of graphene, utilizing N_2O as the oxidation gas precursor. Note that for the normal case, all conditions are the same except for the 5 min of N_2O flow.

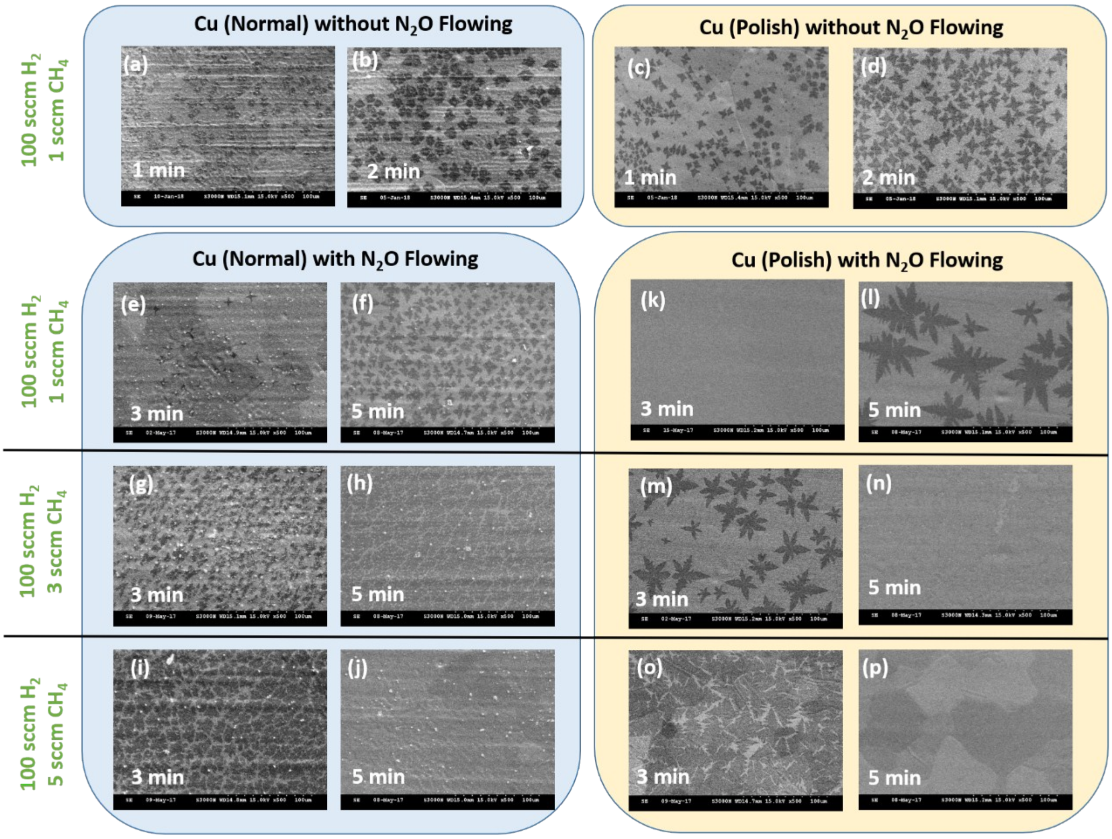

Figure S3, SEM images of graphene growth on Cu (normal) (a-b), Cu (polish) (c-d); Cu (normal) with and Cu (polish) with a N_2O gas flow and with different H_2/CH_4 gas flow ratios. Note that (k) indicates that 1. the N2O flow completely oxidized the Cu surface, and 2. compared to (e), the rough Cu surface has a greater chance for H_2 surface reduction and carbon atom nucleation; in other words, the rough Cu surface is more chemically active. As an optimization result of those 16 SEM images, the condition (k-i) was chosen for further study.

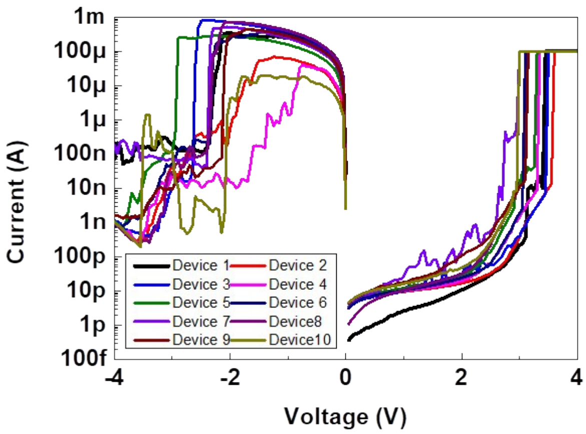

Figure S4, IV curve of Set and Reset processes of 10 different graphene-based RRAM, where CC at 100 µA.