Supporting Information

Ag@Pd nanoparticles immobilized on nitrogen doped graphene carbon

nanotube aerogel as a superb catalyst for dehydrogenation of formic acid

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The turnover frequency (TOF) calculations

The TOF is based on the number of (Ag+Pd) atoms in catalyst, which is calculated from the equation as follows:

where P_0 is the atmospheric pressure (101325 Pa), V is the final generated volume of (H₂ + CO₂) gas, R is the universal gas constant (8.3145 m³ Pa mol⁻¹ K⁻¹), T is the room temperature (298 K), n_{AgPd} is the total molar number of (Ag + Pd) atoms in catalyst and t is the determined time of the reaction in hour.

 $TOF = P_0V / 2RT n_{AgPd}t$

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Fig. S1. XRD patterns of Ag/N-GCNT aerogel, Pd/N-GCNT aerogel and Ag@Pd/N-GCNT aerogel.



Fig. S2. High resolution XPS spectra of N 1s, Pd 3d, and Ag 3d.