

Supporting Information

Synthesis of Nickel Germanide (Ge₁₂Ni₁₉) Nanoparticles for Durable Hydrogen Evolution Reaction in Acid Solutions

*Jee-Yee Chen, Shao-Lou Jheng and Hsing-Yu Tuan**

†Department of Chemical Engineering, National Tsing Hua University, Hsinchu 30013,
Taiwan. E-mail: hytuan@che.nthu.edu.tw

AUTHOR EMAIL ADDRESS: a1593577852@hotmail.com, jeeyeechen@gmail.com

*Corresponding author.

Phone: (886)3-571-5131

Email: hytuan@che.nthu.edu.

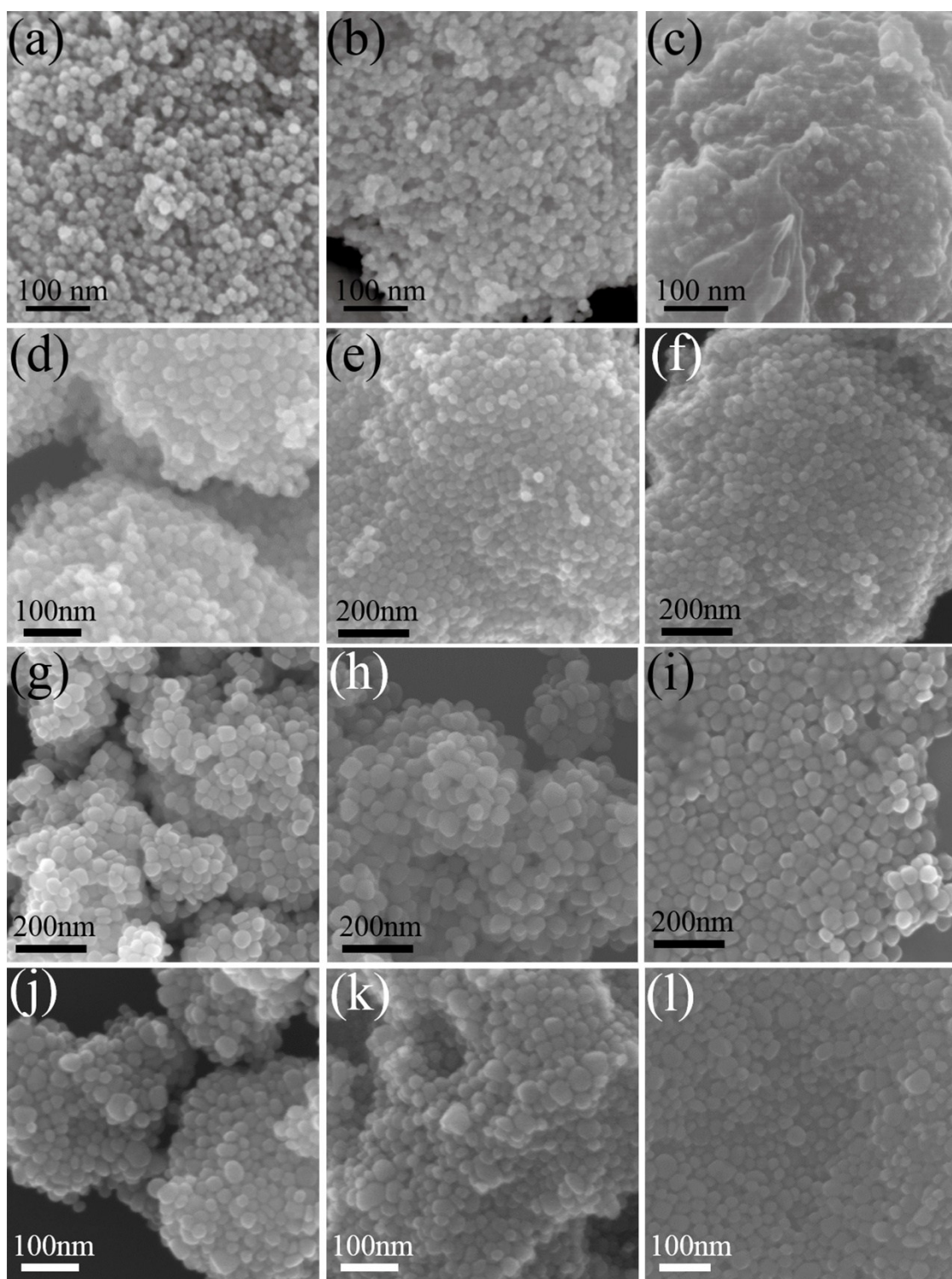


Figure S1. SEM images of Ge₁₂Ni₁₉ nanoparticles sonicated in four different washing solvent: (a - c) THF, (d - f) toluene, (g - i) acetic acid, and (j - l) Saturated NaBH₄ in THF for different time: (a, d, g, h) 30 minutes, (b, e, h, k) 60 minutes and (c, f, i, l) 90 minutes.

The calculation for the energy conversion.

$$\text{Electrolysis voltage} = 2.2 \text{ V}$$

$$\text{Electrolysis current} = 120 \text{ mA}$$

$$\begin{aligned}\text{Consumption wattage} &= 2.2 \text{ V} \times 0.12 \text{ A} \\ &= 0.264 \text{ W}\end{aligned}$$

$$\begin{aligned}\text{Hydrogen evolution rate} &= 0.12 \text{ A} \\ &= 5.7 \times 10^{-7} \text{ mol s}^{-1} \\ &= 0.163 \text{ J s}^{-1} \\ &= 0.063 \text{ W}\end{aligned}$$

$$\begin{aligned}\text{Electrolysis efficiency} &= \frac{\text{Hydrogen evolution rate}}{\text{Consumption wattage}} \\ &= \frac{0.163 \text{ W}}{0.264 \text{ W}} \\ &= 61.7 \%\end{aligned}$$