# Supporting Information

## Beyond Colloidal Synthesis: Nanofiber Reactor to Design Self-Supported Core-Shell $Pd_{16}S_7/MoS_2$/CNFs Electrode for Efficient and Durable Hydrogen Evolution Catalysis

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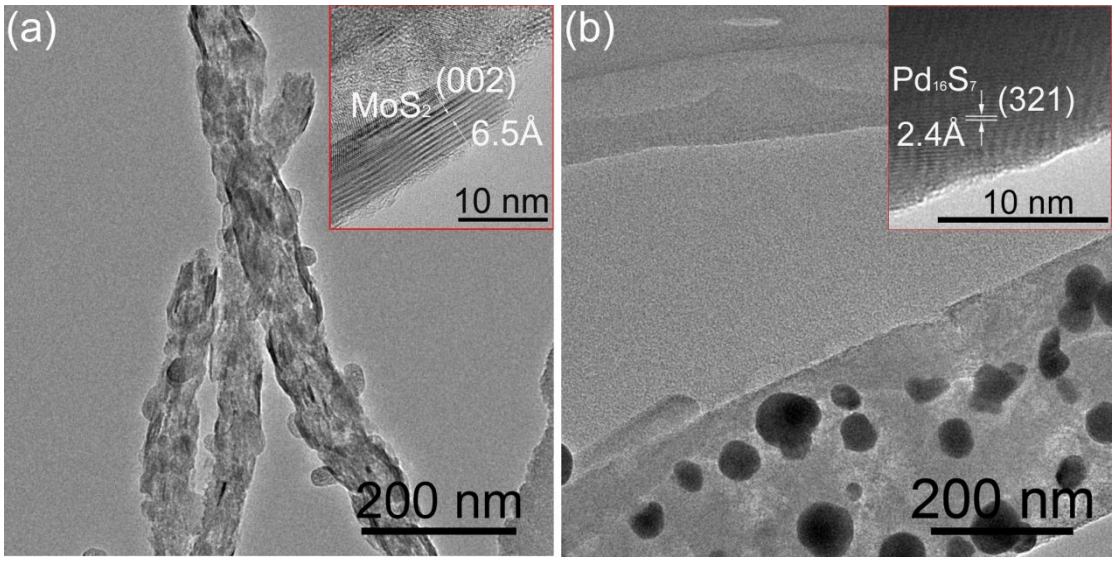



**Figure S1**. (a)The TEM image of $MoS_2$/CNFs hybrid and insets show the HR-TEM image of $MoS_2$/CNFs hybrid. (b) The TEM image of $Pd_{16}S_7$/CNFs hybrid and insets show the HR-TEM image of $Pd_{16}S_7$/CNFs hybrid.

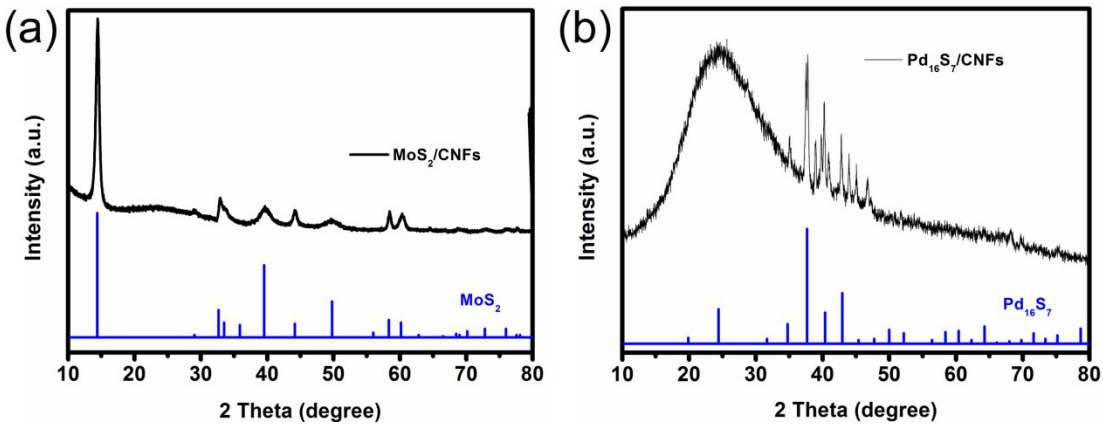



**Figure S2**. The XRD patterns of (a) $MoS_2$/CNFs hybrid and (b) $Pd_{16}S_7$/CNFs hybrid.

**Table S1.** Comparison of HER activity data among various catalysts

| Catalyst | Overpotential [mV] at $J$ = 10 mA cm$^{-2}$ | Tafel slope [mV dec$^{-1}$] | $j_0$ (mA cm$^{-2}$) | $C_{dl}$ (mF cm$^{-2}$) | ECSA (cm$^2$) |
|---|---|---|---|---|---|
| $MoS_2$/CNFs | 183 | 194 | 0.94 | 35.4 | 0.92 |
| $Pd_{16}S_7$/CNFs | 245 | 225 | 0.83 | 19.4 | 1.44 |
| $Pd_{16}S_7/MoS_2$/CNFs | 83 | 113 | 1.42 | 75.1 | 2.67 |
| Pt/C | 34 | 33 | - | - | - |

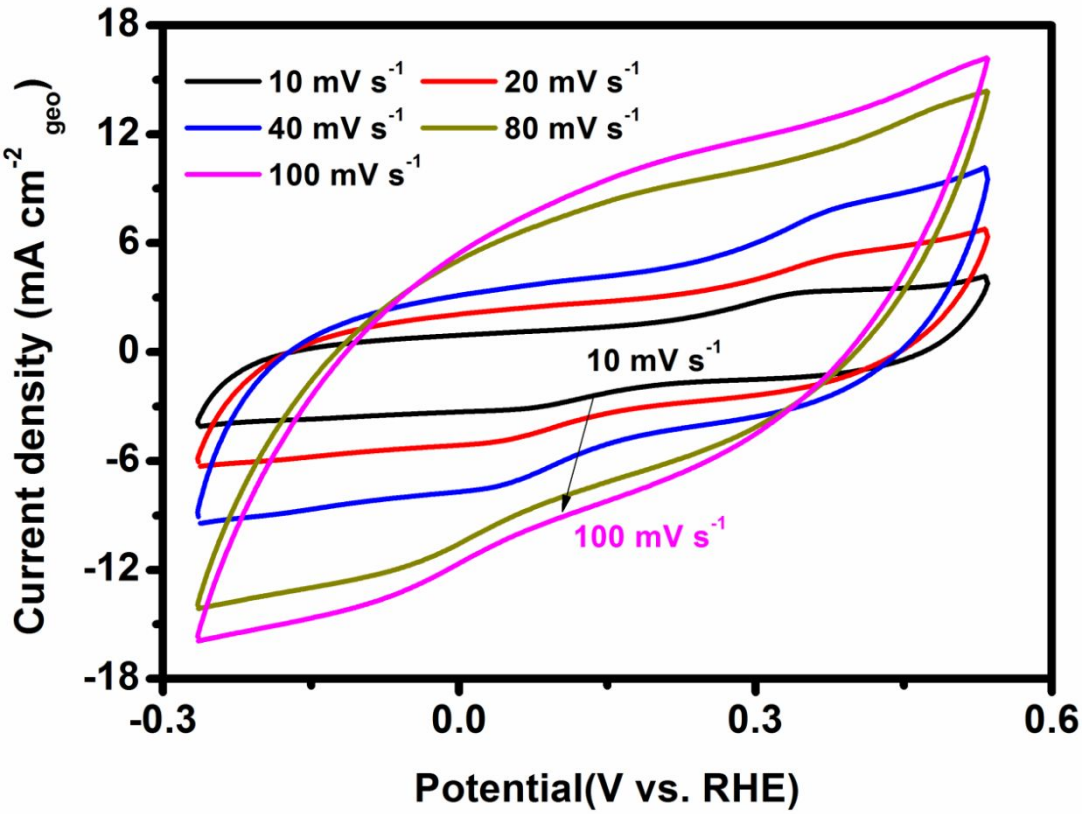



**Figure S3**. The electrochemical cyclic voltammograms of $Pd_{16}S_7/MoS_2$/CNFs hybrid at potential scanning rates from 10 to 100 mV s$^{-1}$

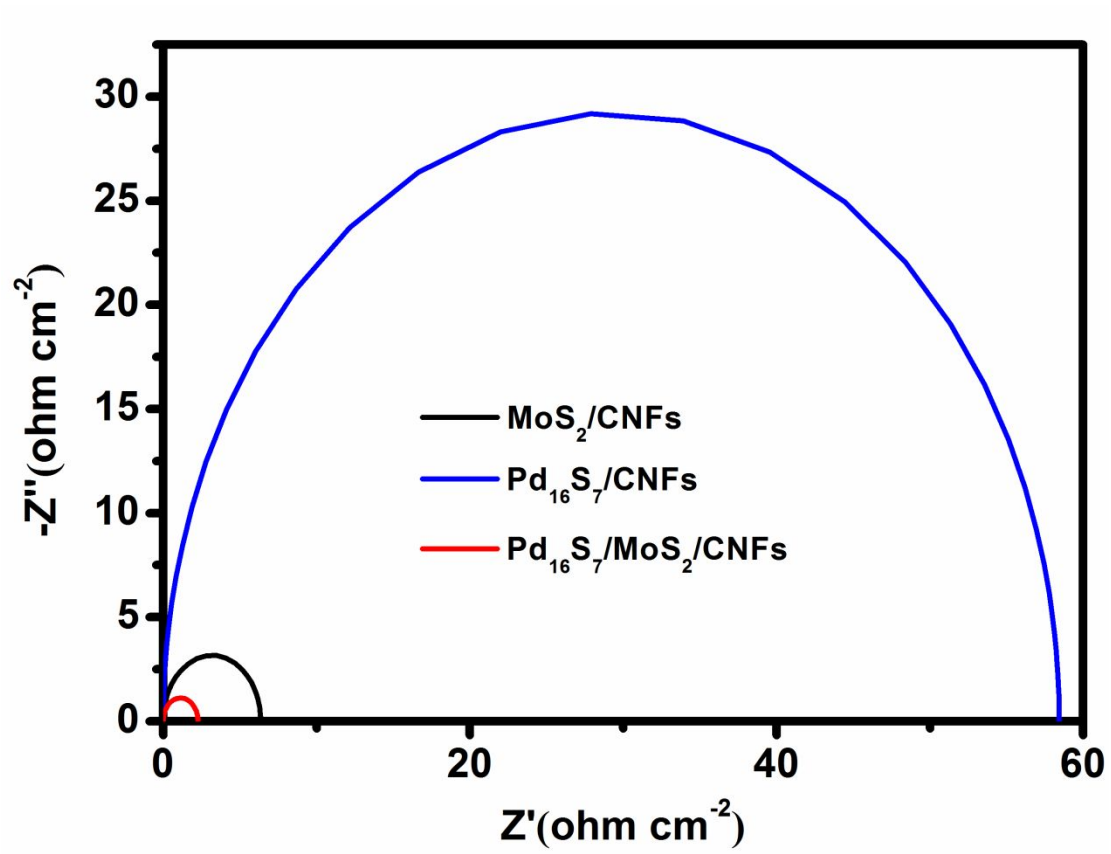



**Figure S4**. The electrochemical impedance spectra of $MoS_2$/CNFs, $Pd_{16}S_7$/CNFs and $Pd_{16}S_7$/$MoS_2$/CNFs hybrids.

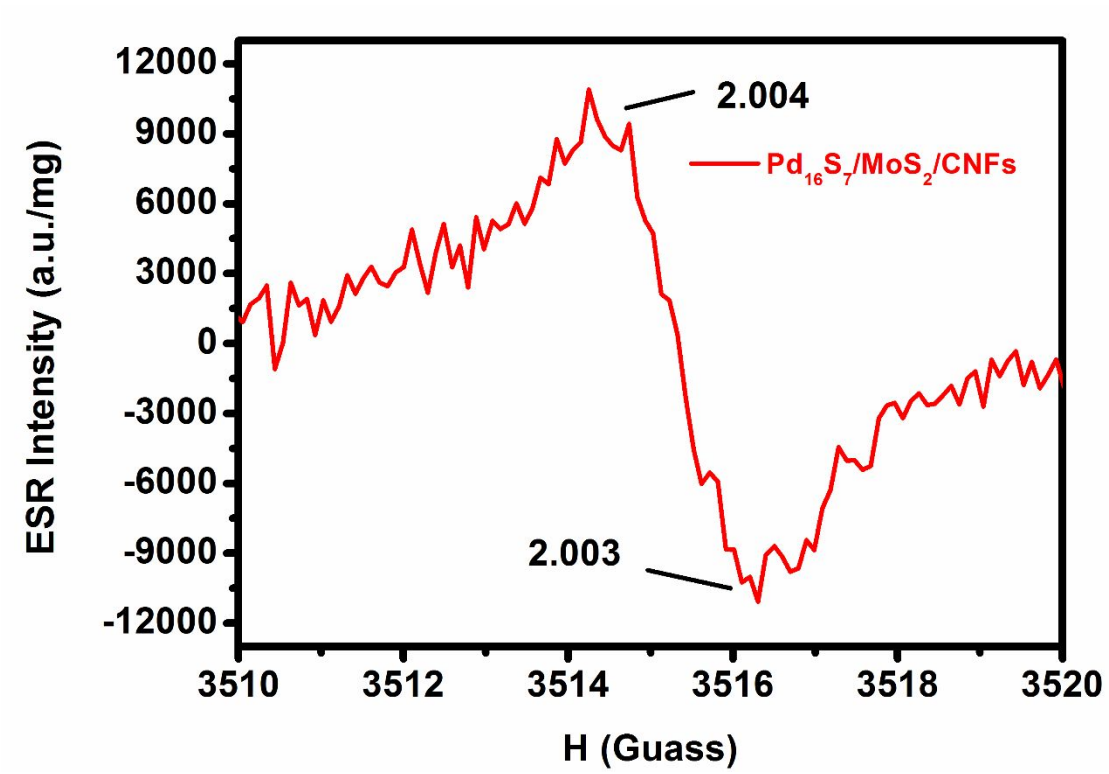
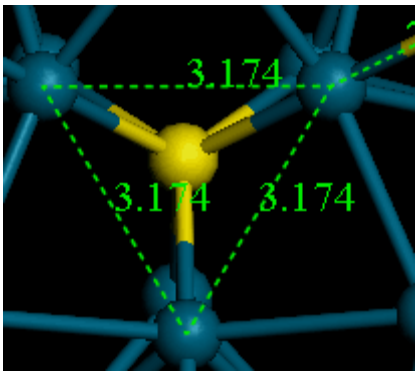
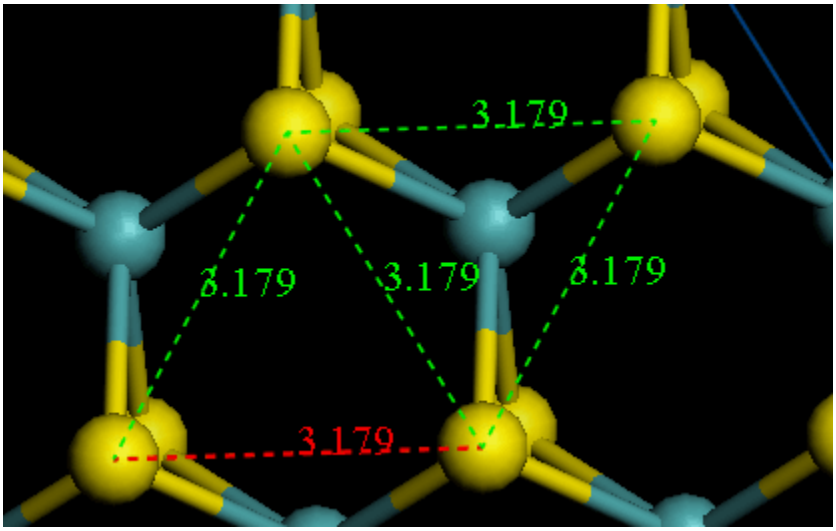



**Figure S5**. Electron spin resonance spectra for $Pd_{16}S_7/MoS_2/CNFs$





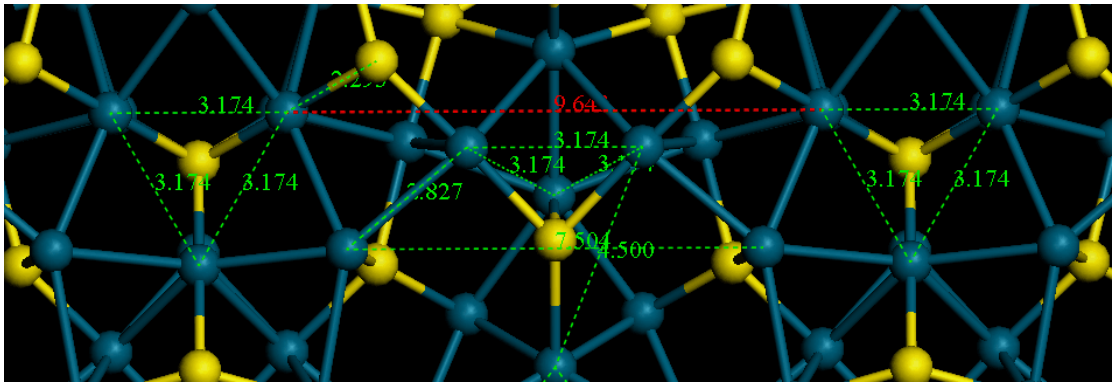




**Figure S6**. DFT model of the $MoS_2$, $Pd_{16}S_7$ and $MoS_2/Pd_{16}S_7$.