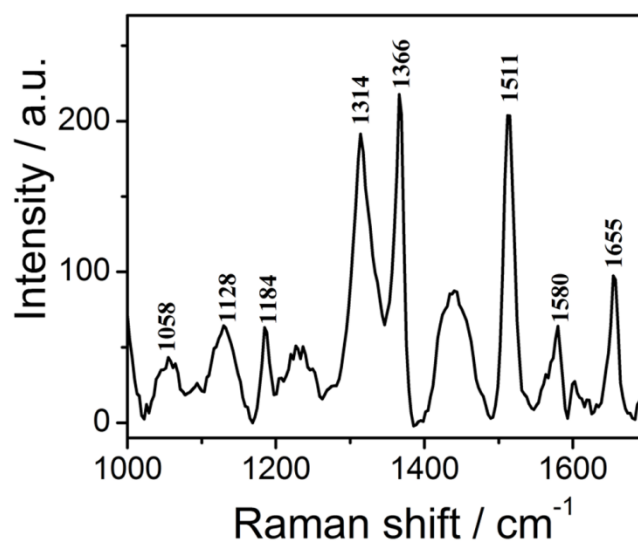


A single-source precursor route to Cu/V₂O₅ composite as surface-enhanced Raman scattering substrates and catalysts for cross coupling reaction

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1. The normal Raman spectrum of 0.01 M R6G methanol solution



FigureS1. The normal Raman spectrum of 0.01 M R6G methanol solution.

2. The normal Raman spectrum of MBA powder

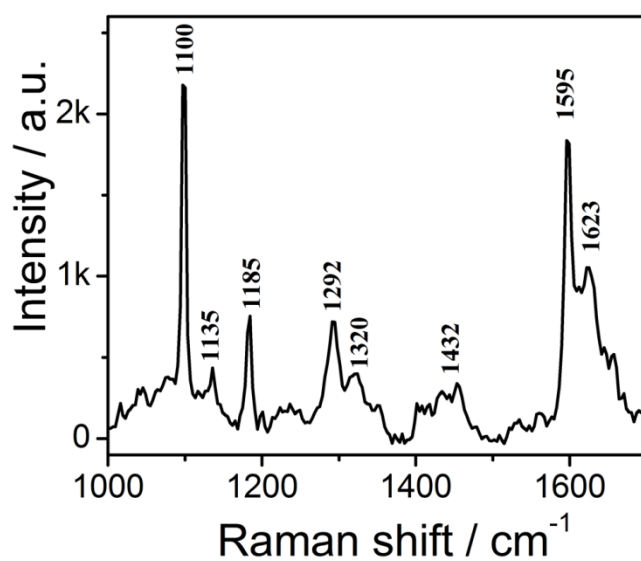


Figure S2. The normal Raman spectrum of MBA powder.

3. Distribution histograms of the width and length of V₂O₅ nanoribbons

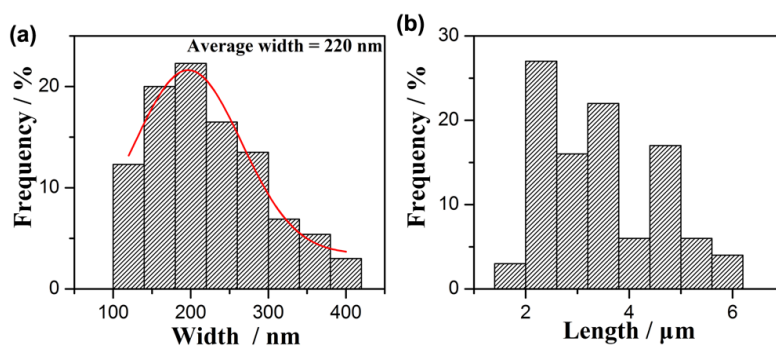


Figure S3. (a) Distribution histogram of the width of V₂O₅ based on 130 nanoribbons;

(b) Statistic of the length of V₂O₅ based on 130 nanoribbons.

4. XRD pattern of Cu/V₂O₅ composite after SERS detection

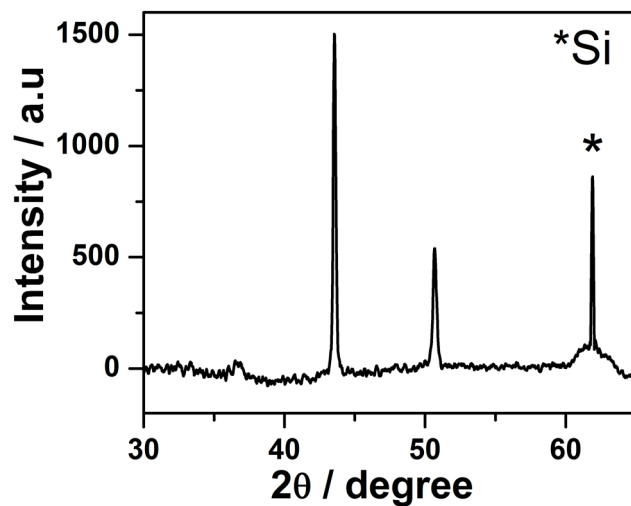


Figure S4. XRD pattern of Cu/V₂O₅ composite after SERS detection, showing two strong copper diffraction peaks.

5. XRD pattern of Cu/V₂O₅ composite after catalytic reaction

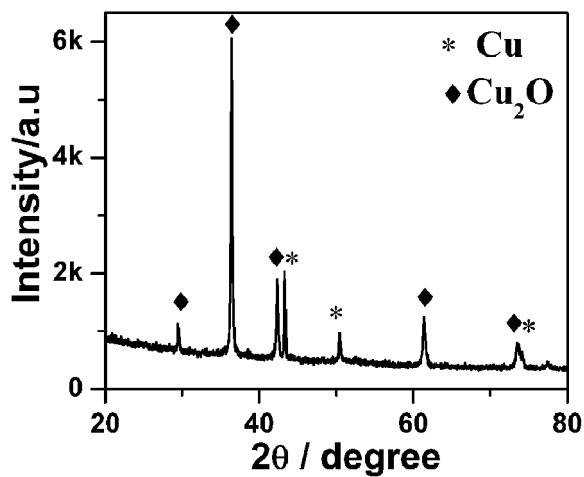


Figure S5. XRD pattern of Cu/V₂O₅ composite after catalytic reaction.

6. Enhancement factor (EF) calculation

The average SERS enhancement factor (EF) is calculated based on the formula:

$$EF = \frac{I_{SERS} N_0}{I_0 N_{SERS}}$$

where I_{SERS} and N_{SERS} are the peak intensity of Raman and probe molecule number under SERS conditions, respectively. I_0 and N_0 are the peak intensity of the normal Raman and probe molecule number measured with 0.01 M R6G aqueous solution.

$$N_0 = n_0 N_A = C_0 V_0 N_A;$$

$$N_{SERS} = n_{SERS} N_A = C_{SERS} V_{SERS} N_A$$

where n_0 and n_{SERS} are the amount substance of R6G molecules in the scattering volume; V_0 and V_{SERS} are the scattering volume ($V_0 = V_{SERS}$); C_0 and C_{SERS} are the concentration of R6G solution; N_A is Avogadro constant.

$$\text{So, } EF = \frac{I_{SERS} N_0}{I_0 N_{SERS}} = \frac{I_{SERS} C_0 V_0 N_A}{I_0 C_{SERS} V_{SERS} N_A} = \frac{I_{SERS} C_0}{I_0 C_{SERS}} = \frac{3897 \times 10^{-2}}{205 \times 10^{-7}} = 1.9 \times 10^6$$