

Efficient conversion of lactic acid to alanine over noble metal supported on Ni@C catalysts

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Figure S1. The TLC analysis results of different samples. 1-2: the standard sample of Ala and LA;
3-5: the reaction solution catalyzed by Ru/Ni@C (reactants: 3-LA, 4-glycerol, 5-pyruvate acid).

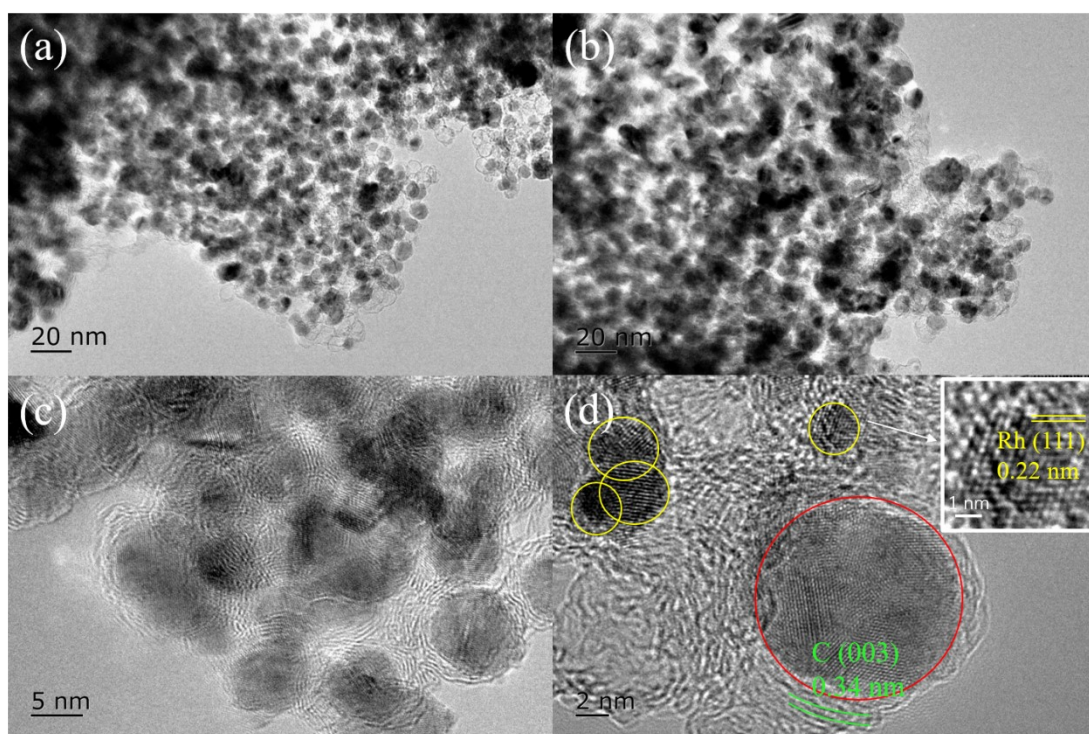


Figure S2. The TEM and HRTEM images of Rh/Ni@C.

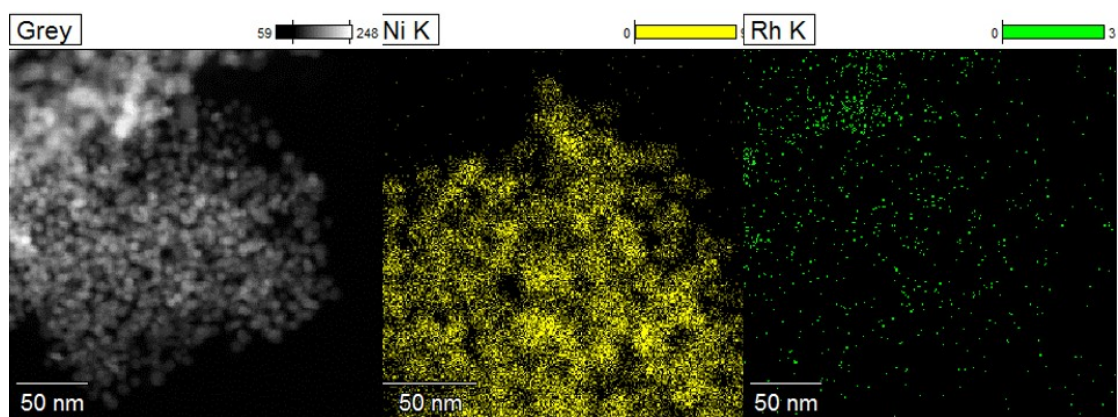


Figure S3. The chemical element mapping for the spatial distribution of Ni and Rh of Rh/Ni@C.

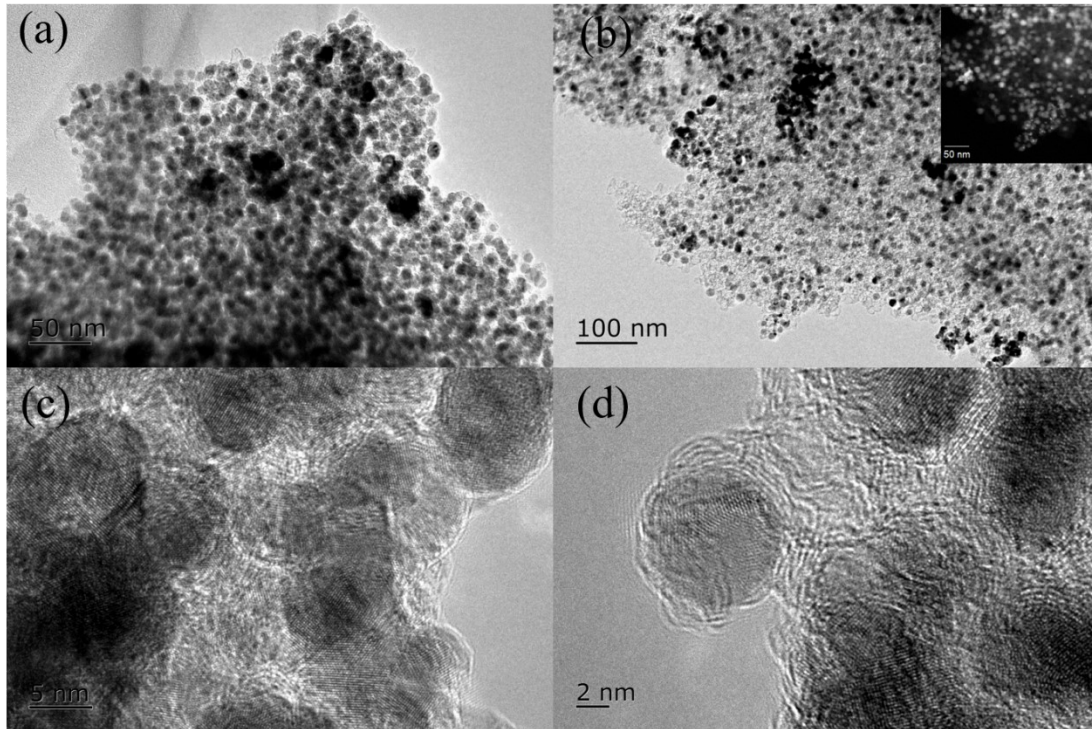


Figure S4. The TEM and HRTEM images of Pt/Ni@C.

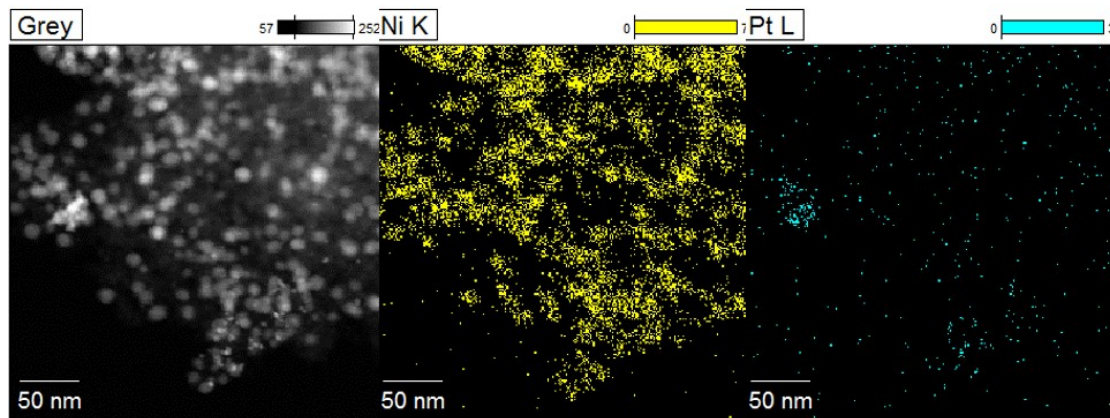


Figure S5. The chemical element mapping for the spatial distribution of Ni and Pt of Pt/Ni@C.

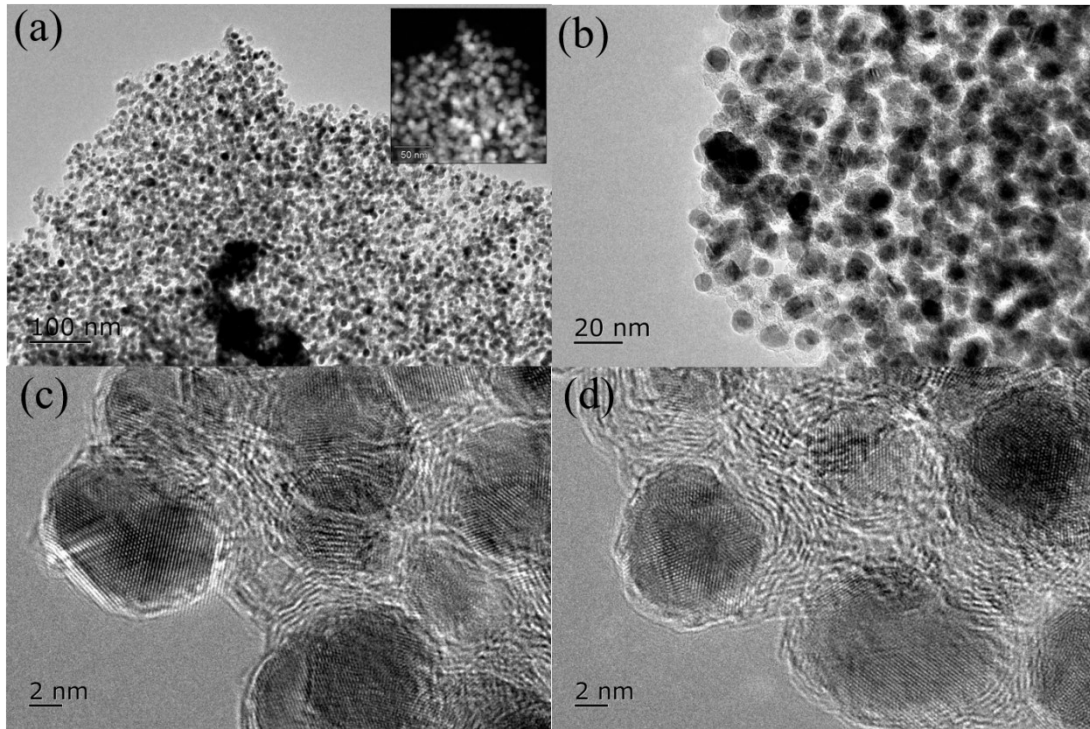


Figure S6. The TEM and HRTEM images of Pd/Ni@C.

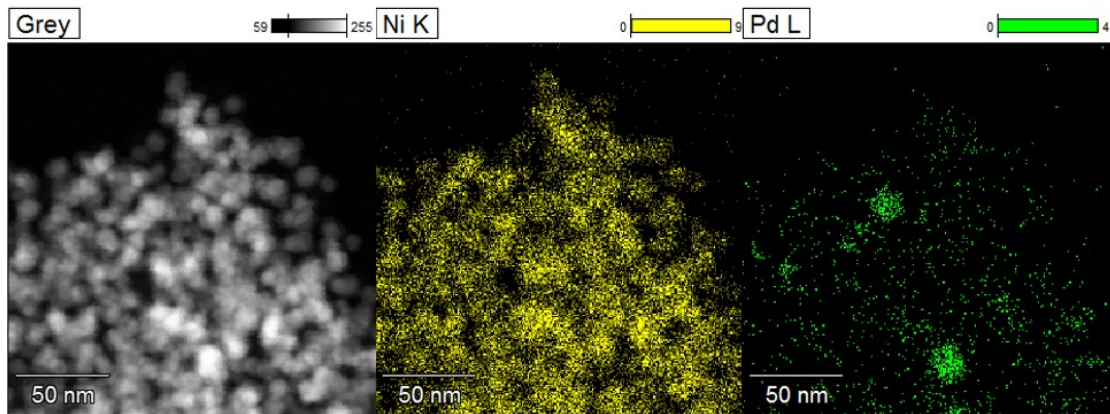


Figure S7. The chemical element mapping for the spatial distribution of Ni and Pd of Pd/Ni@C.

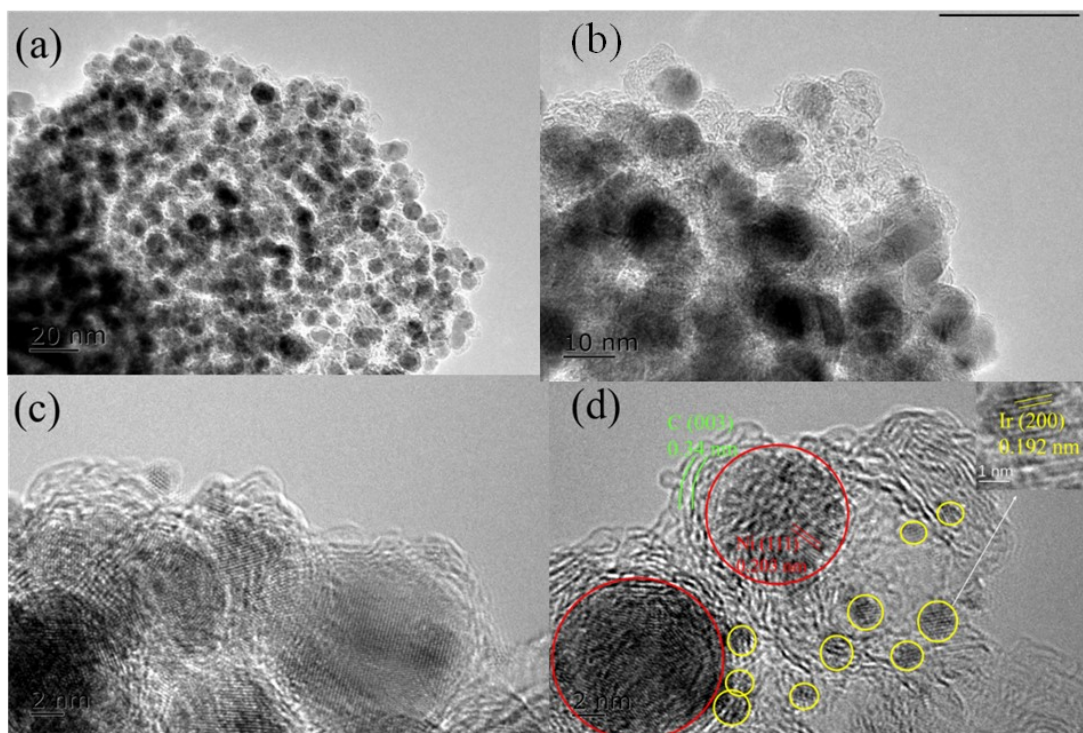


Figure S8. The TEM and HRTEM images of Ir/Ni@C.

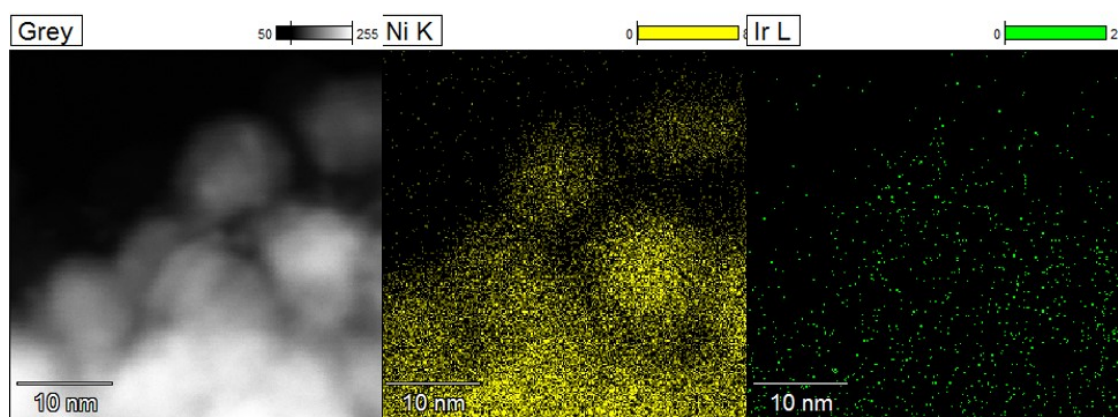


Figure S9. The chemical element mapping for the spatial distribution of Ni and Ir of Ir/Ni@C.

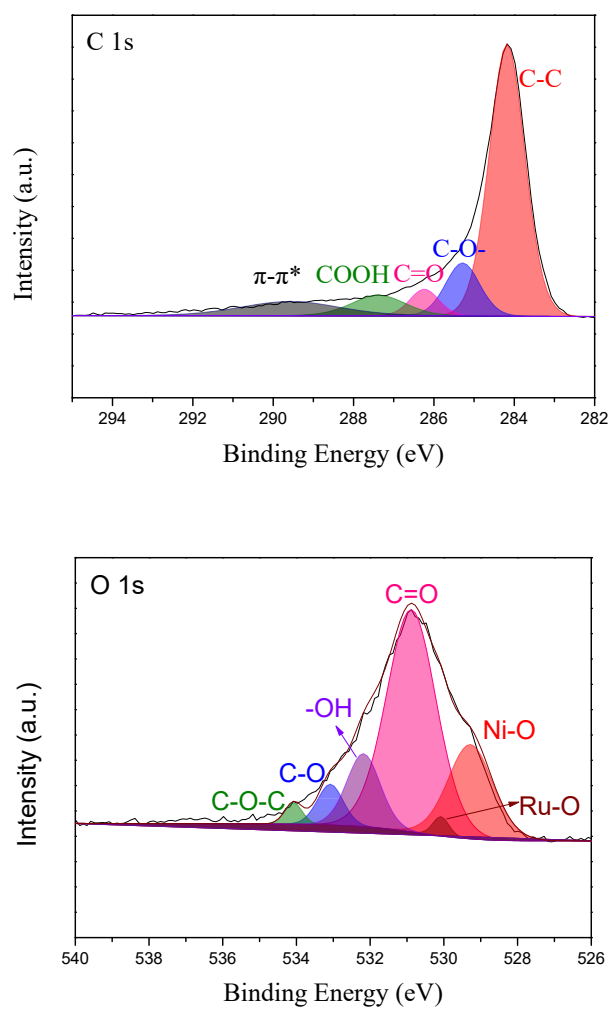


Figure S10. C1s and O1s XPS spectra of Ru/Ni@C catalyst.

Table S1. The acid amount of catalysts.

| Catalysts | Ni@C | CS | Ru/CS | Ru/Ni@C |
|-------------------------|-------|-------|-------|---------|
| Acid amount (mmol/g) | 0.050 | 0.047 | 0.126 | 0.209 |



Figure S11. Photo images for the magnetic separable property of Ru/Ni@C catalyst.