



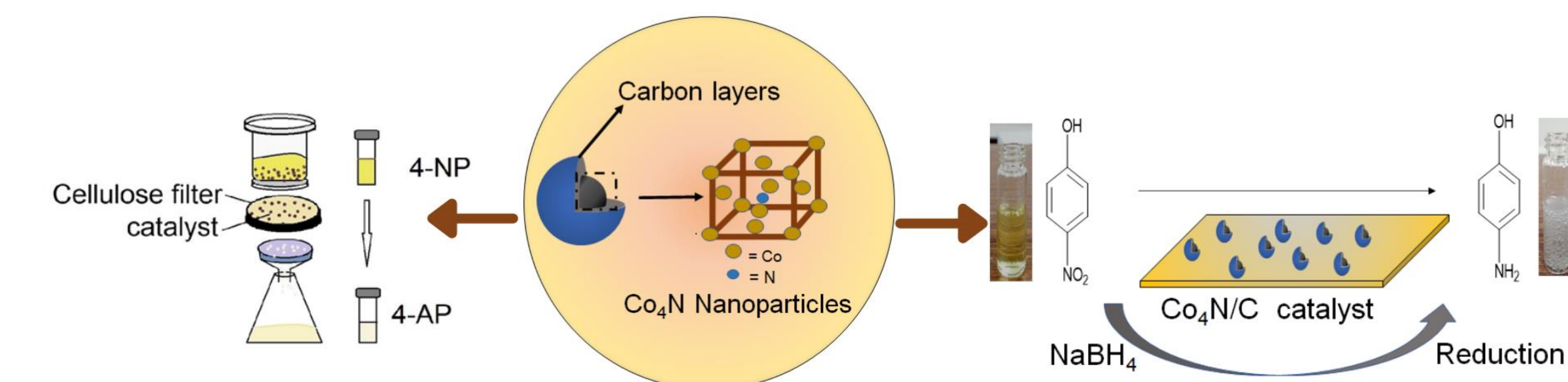
Facile Synthesis of Carbon Supported Cobalt Nitride for Heterogeneous Catalysis

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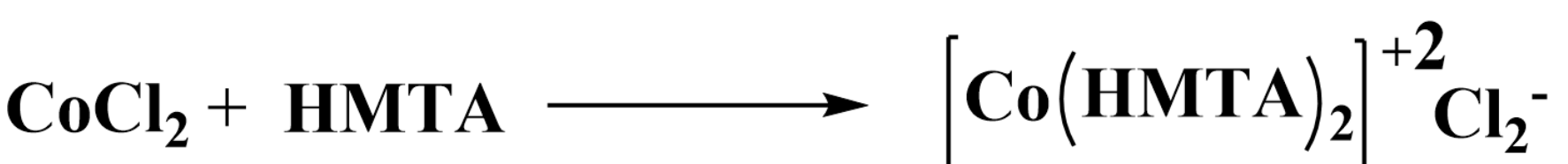
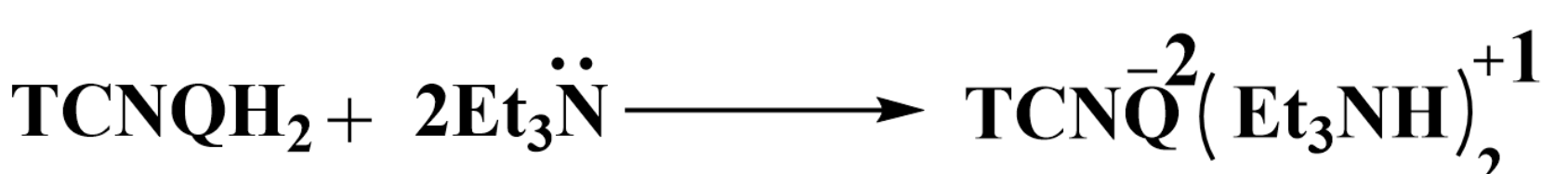
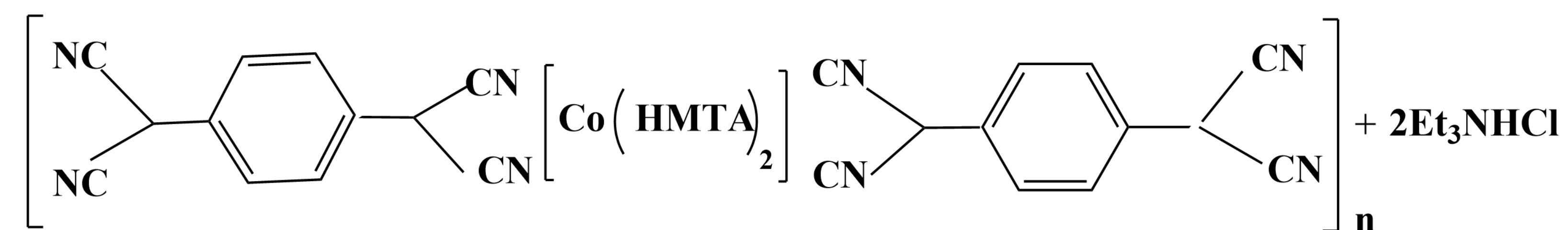
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Abstract

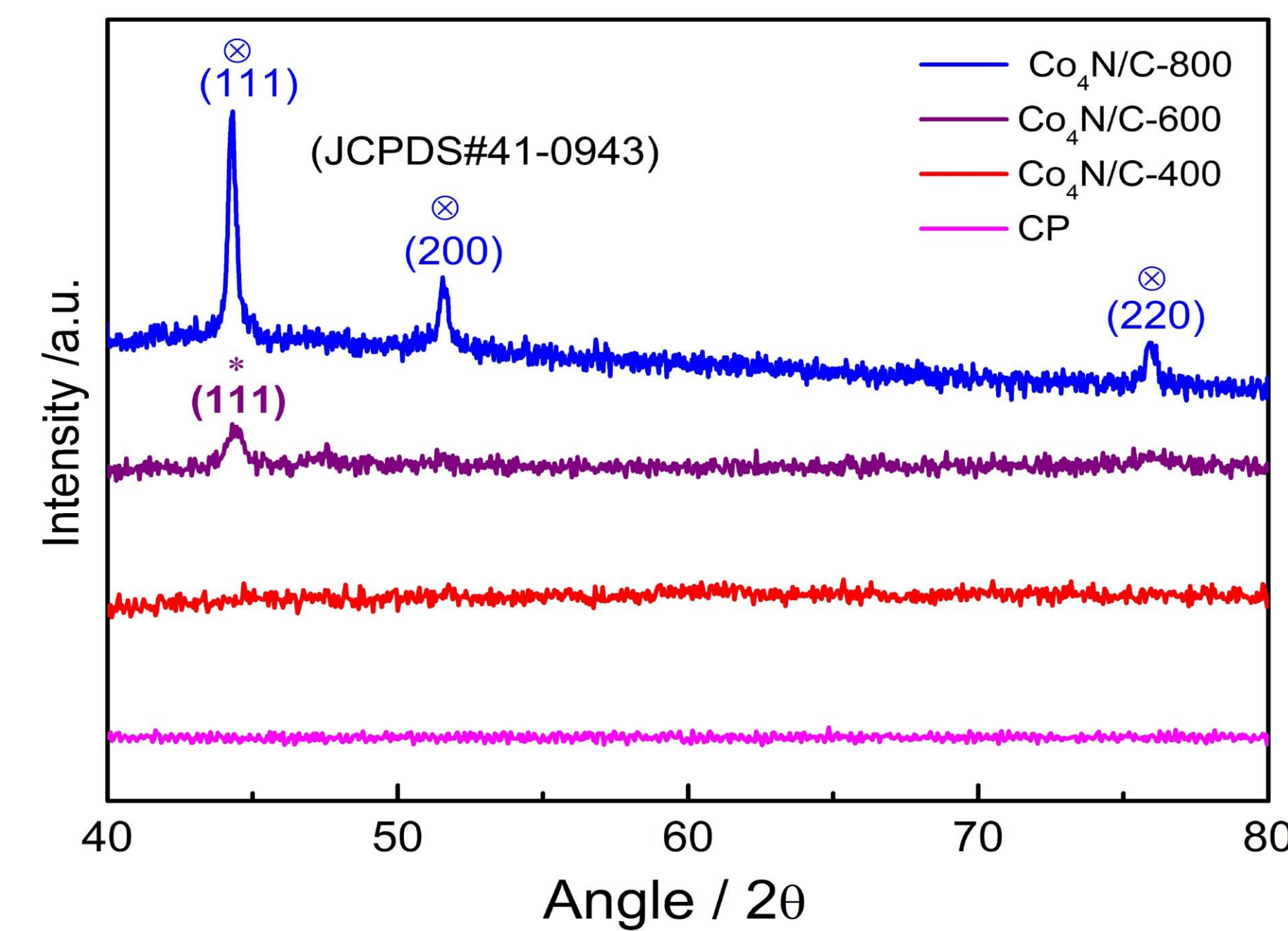
Transition metal nitrides have attracted great interest as non-noble catalysts in heterogeneous catalysis due to their exceptional catalytic potential and stability, yet the approach for their synthesis remains challenging. This study entails to an investigative analysis of employing a facile and simplistic procedure for the synthesis of $\text{Co}_4\text{N}/\text{C}$ which has been well established with X-ray Photoelectron and absorption spectroscopy. The extraordinary catalytic activity of $\text{Co}_4\text{N}/\text{C}$ can be attributed to the Co_4N nanoparticles as active sites, and the carbon support doped with nitrogen provides an expressway for the transport of electrons required for catalytic reduction.



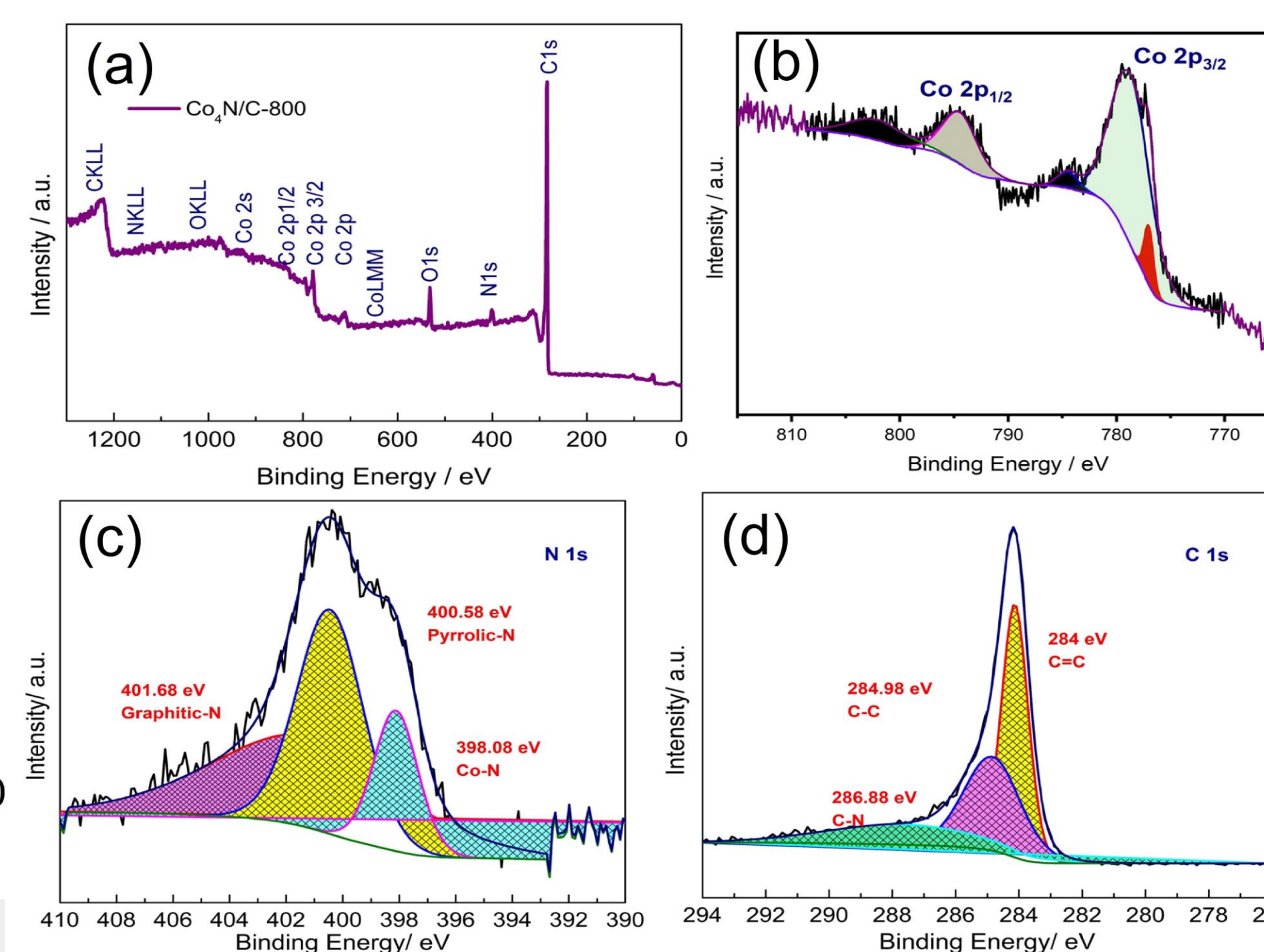
Synthesis Scheme



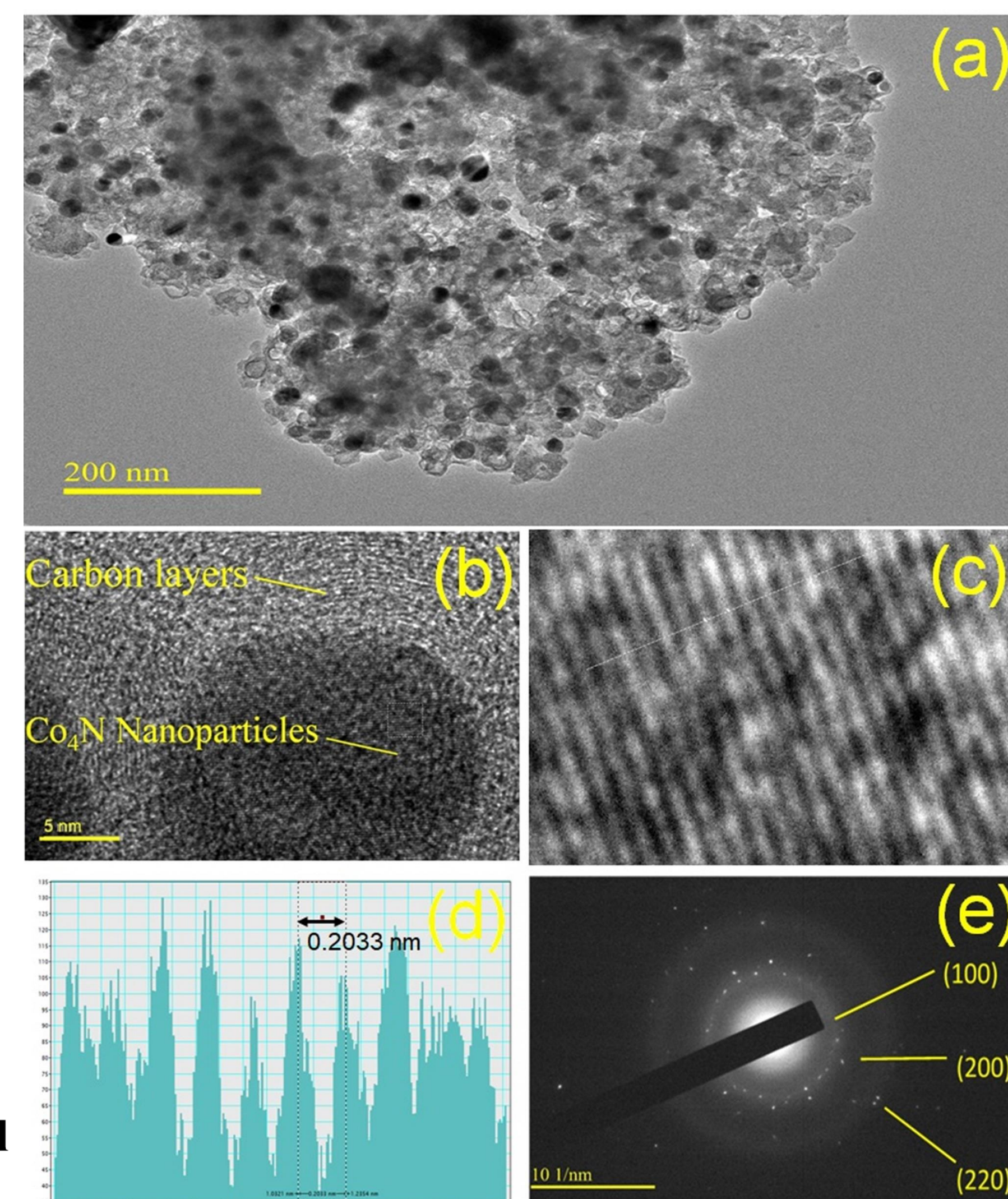
Results and Discussion



The diffraction peaks of PXRD at 2θ value of 44.2° , 51.5° , and 76° correspond well with $\text{Co}_4\text{N}/\text{C}$

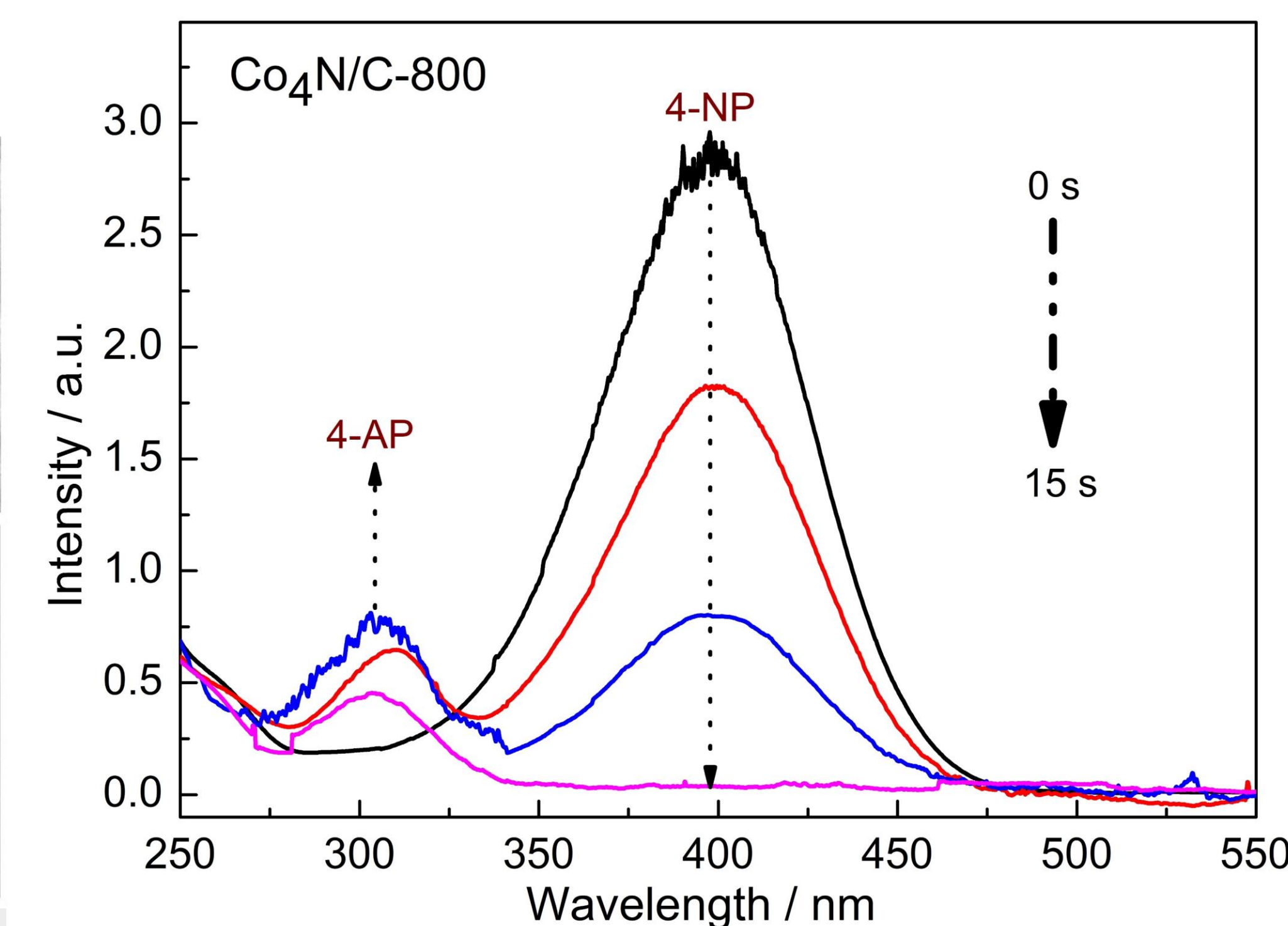
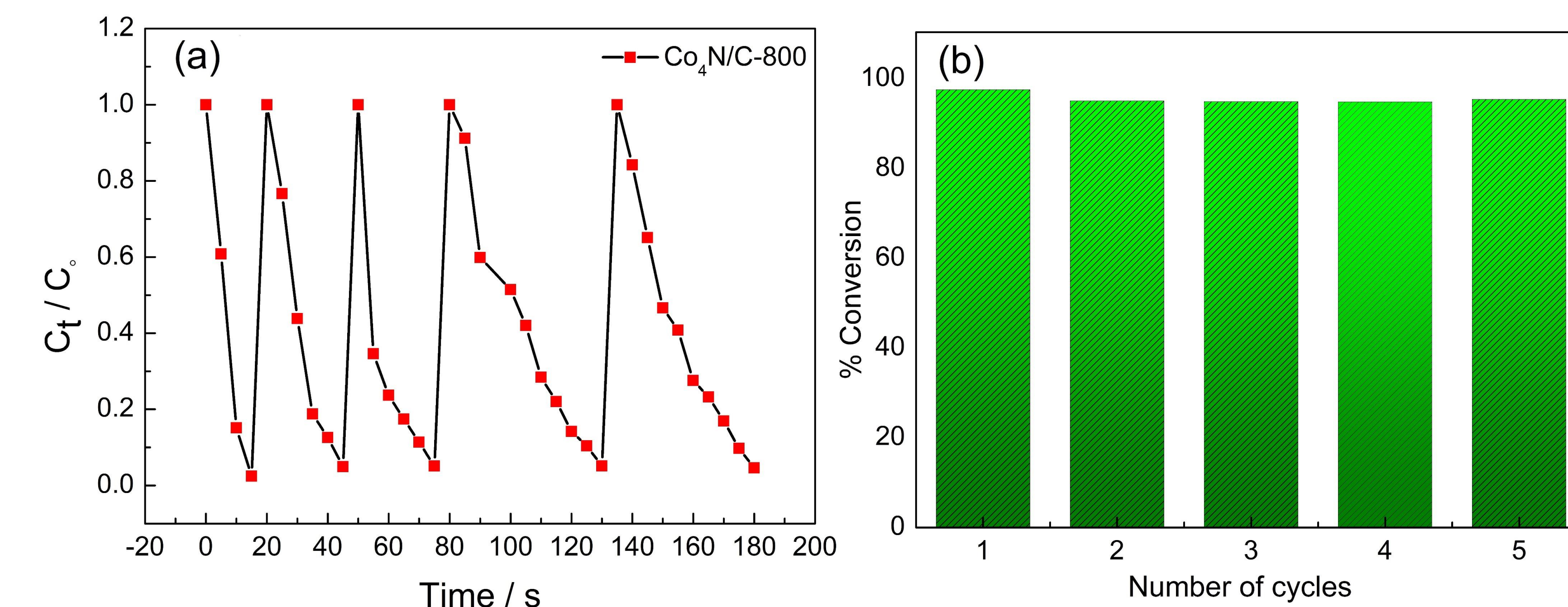
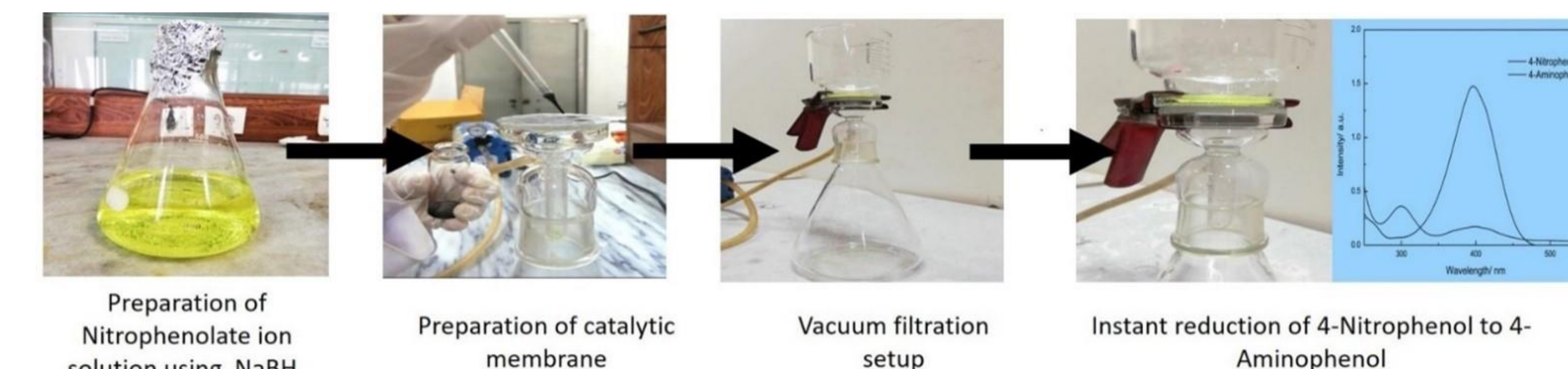


XPS spectra indicating the formation of single phase Co_4N .



Average distance of 0.2033 nm corresponds to the (111) plane of Co_4N

Selective reduction of 4-Nitrophenol



Conclusion

A highly potent catalyst $\text{Co}_4\text{N}/\text{C}$ successfully synthesized by direct carbonization of coordination polymer containing nitrogen-rich ligands under N_2 flow. The nanostructured catalyst $\text{Co}_4\text{N}/\text{C}$ -800, among other synthesized catalysts, has shown outstanding catalytic activity for the reduction of the 4-Nitrophenol to 4-Aminophenol. The catalyst has also been immobilized on the surface of the cellulose membrane filter. The immobilized catalyst has shown excellent performance for the dynamic conversion of the 4-Nitrophenol to 4-Aminophenol and 4-nitrophenol in the contaminated water, immediately reduced.

Acknowledgements

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