Supporting information for

Graphitic Carbon Embedded with Fe/Ni Nano-Catalysts Derived from Bacterial Precursor for Efficient Toluene Cracking

Shifei Kang [a], Maofen He [a], Chaochuang Yin [a,b], Haiyang Xu [b],Qing Cai [a], Yangang Wang [b*], Lifeng Cui [a*]

a. Department of Environmental Science and Engineering, University of Shanghai for Science and Technology, Shanghai 200093, P.R. China

b. College of Biological Chemical Science and Engineering, Jiaxing University, Zhejiang 314001, China

*Corresponding authors.

E-mail addresses: ygwang8136@mail.zjxu.edu.cn (Y. Wang), lifeng.cui@gmail.com (L. Cui).

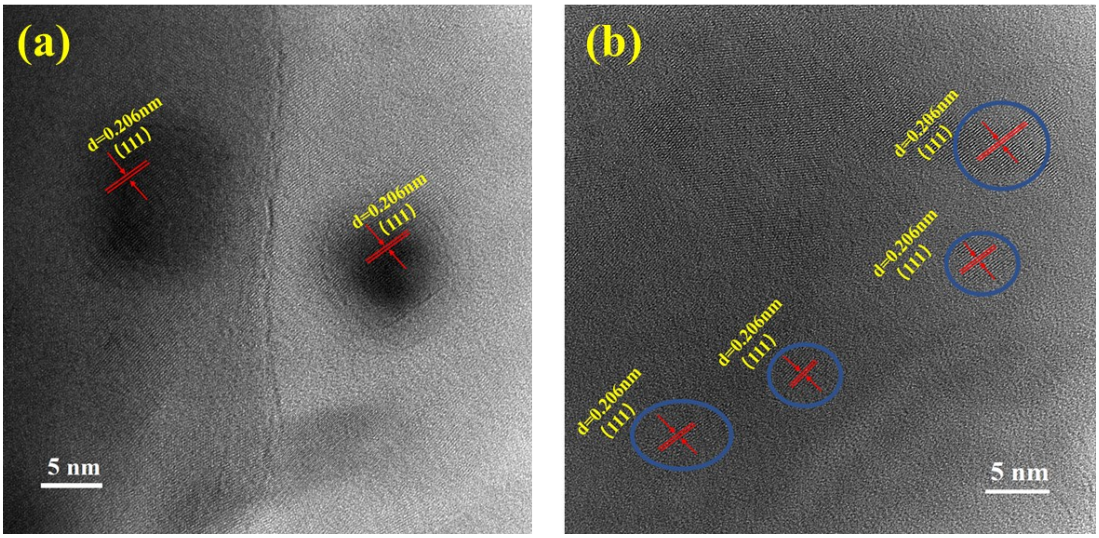

Figure S1. a, b The HR-TEM images of Fe/Ni alloy nanoparticles with typical (1 1 1) lattice in BC-FeNi sample.

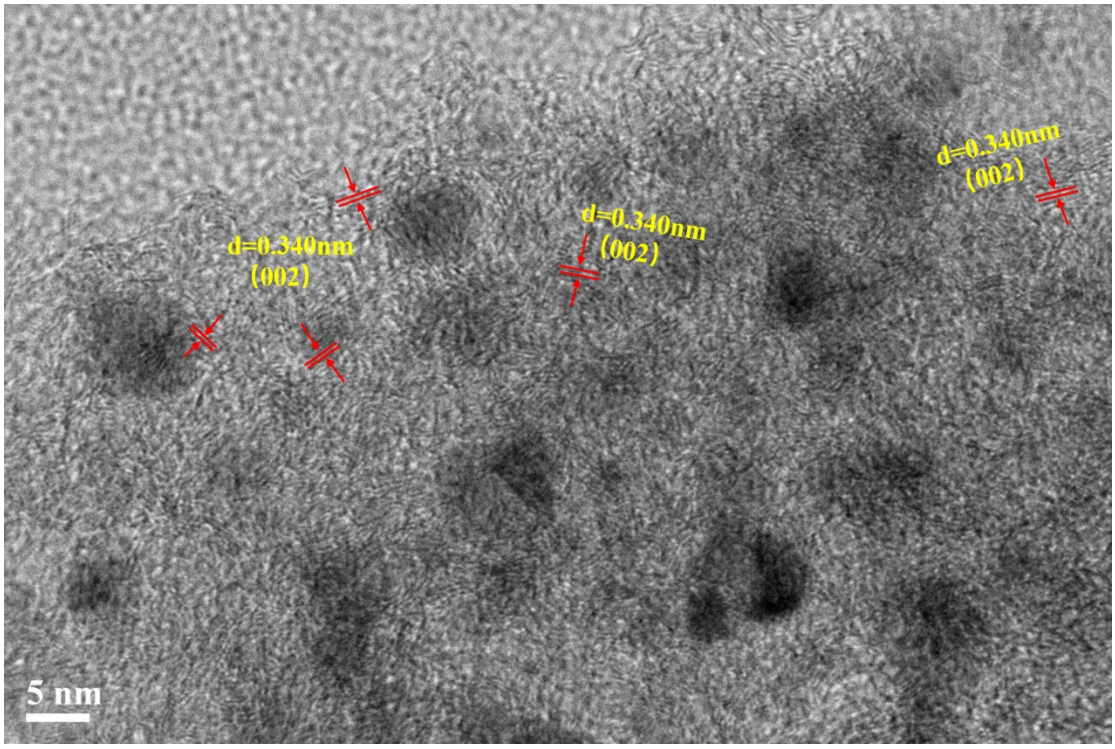

Fig. S2 The enlarged TEM image of BC-FeNi sample showing the typical graphitic carbon rings.

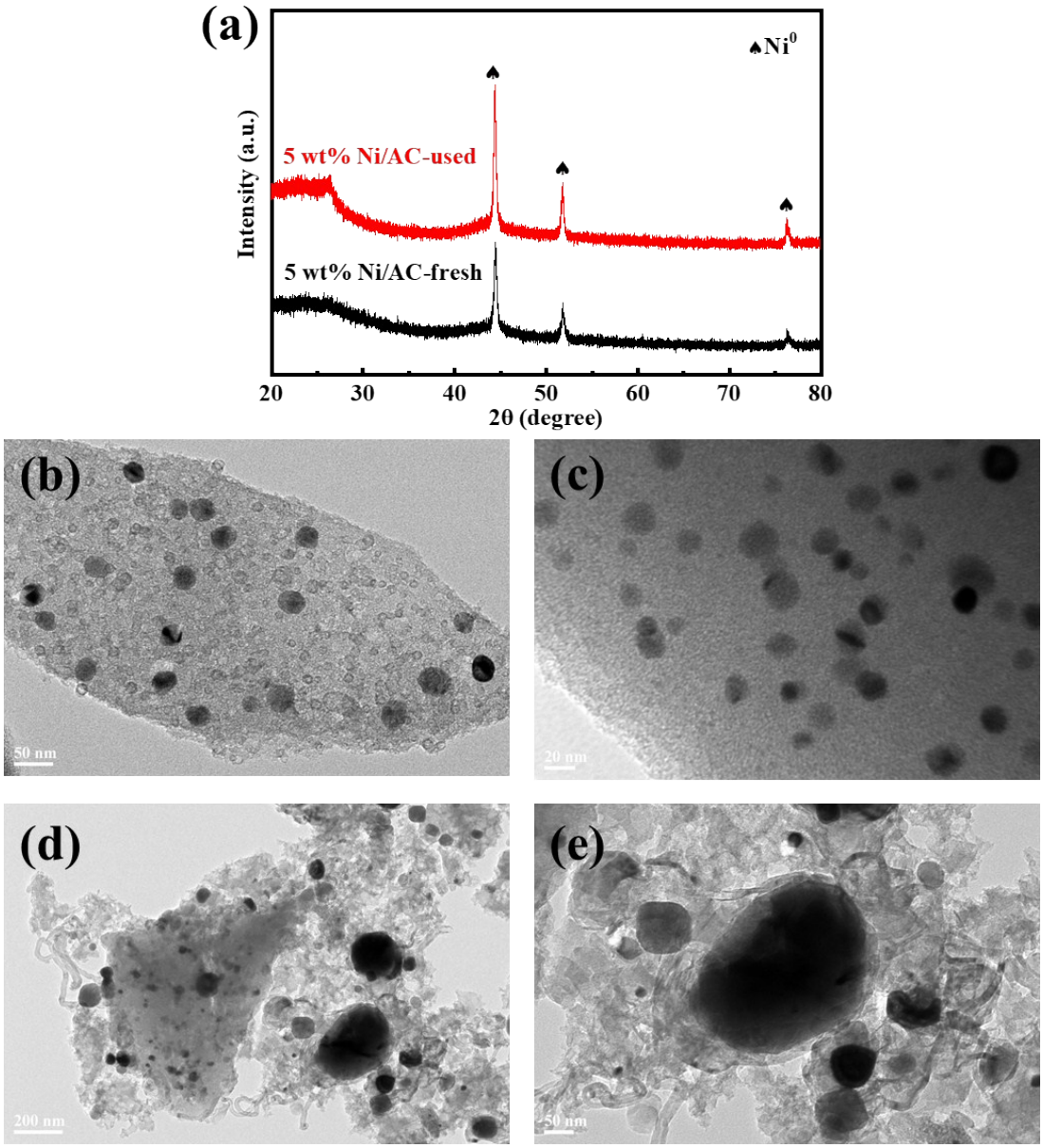

Fig. S3 a. The contrastive XRD patterns of 5 wt% Ni loaded active carbon (5 wt% Ni/AC) control catalyst before and after 24h reuse. b,c The TEM images of fresh AC-FeNi and d,e The TEM images of used AC-FeNi.

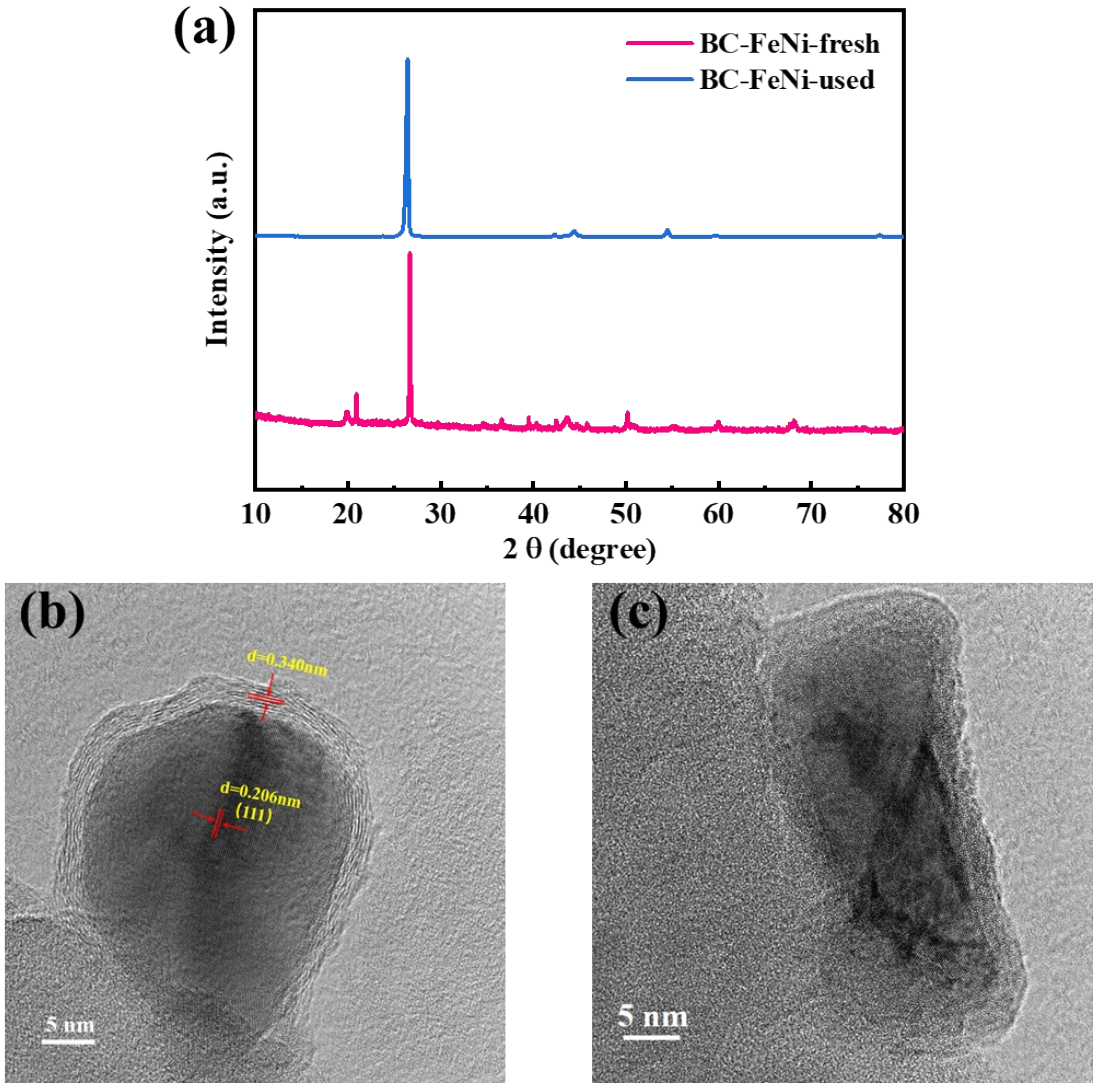

Fig. S4 a. The contrastive XRD patterns of BC-FeNi before and after 24h reuse. b. The TEM images of fresh BC-FeNi and c. used BC-FeNi. The graphitic carbon layer protected FeNi alloy structure decreased slightly, but no obvious aggregation and coking can be observed.

Table S1 The comparison between the as-developed BC-FeNi catalyst and other supported Fe/Ni catalysts reported for tar cracking.

No.	metal/carrier	Metal content	Toluene cracking conversion rate	Stability	Ref.
1	Ni/Activated Carbon	15%	600° 74% 700° 92% 800° 95%	decrease from 92% to 81% after 48 h under 700°	1
2	Ni/biomass-derived activated carbon	5.1%	700° 52% 750° 82% 800° 93%	NA	2
3	3Fe8Ni/PG-H700-2	3%Fe,8%Ni	700° 80%	NA	3
4	Ni/PG（palygorskite）	9.9%	700° 61%	NA	4
5	Ni-Fe/PG（palygorskite）	9.8%	700° 66%	NA	4
6	Ni–Fe/MgO-Al_2O_3	10.1%	700° 87%	NA	4
7	Ni/Hematite	6.0%	500° 56% 600° 70% 700° 83% 750° 91% 800° 96%	decrease from 96% to 86% after 10 h under 800°	5
8	Fe3Ni8/Palygorskite	3%Fe,8%Ni	550° 78% 600° 81% 650° 85% 700° 98%	stable under 700° for 48 h	6
9	FeNi/bacterial carbon	1.01%	600° 58% 700° 82.6% 800° 95.8%	slightly decrease from 95.8% to 94.4% after 24 h under 800°	This work

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