

SUPPORTING INFORMATION

One-Pot Green Synthesis of Ag/Ni/Fe₃O₄-Activated Carbon Beads for Recyclable Photo-Fenton Antibiotic Removal and Antibacterial Action: Mechanistic Study and Optimization

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Table S1. FTIR peak positions and corresponding functional groups for the synthesized samples

Peak Position (cm ⁻¹)				Functional Group	Vibrational Mode
ACB	MACB	Ni/MACB	Ag/Ni/MACB		
3729	3733	3734	3733	O–H (hydroxyl group)	Free O–H stretching
3627	3624	3618	3420	O–H (hydroxyl group)	Hydrogen-bonded O–H stretching
3198	3198	3196	3198	N–H (amines) or O–H (carboxylic acids)	Stretching vibration
2959, 2884, 2838	2958, 2884, 2838	2958, 2885, 2838	2958, 2884, 2838,	C–H (alkyl groups)	Asymmetric and symmetric stretching of CH ₃ and CH ₂
2723, 2617, 2583	2723, 2616, 2579	2722, 2616, 2577	2723, 2616, 2581	S–H (thiol)	Stretching vibration
1745	1745	1745	1744, 1590	C=O (carbonyl group)	Stretching vibration (ketones, esters)
1456	1456	1456	1456	C–H (methylene, aromatic ring)	Bending vibration
1375	1375	1374	1374	CH ₃ (methyl groups)	Symmetrical bending
1300	1300	1300	1300	C–O (phenols, esters)	Stretching vibration
1255	1255	1255	1253	C–O–C (ethers)	Asymmetric stretching vibration
1165, 1100	1165, 1100	1165, 1100	1165, 1100	C–O (aliphatic ether and alcohols)	Stretching vibration
1046	1046	1046	1040	C–O–C (polysaccharides)	Stretching vibration
998, 973	998, 973	998, 973	998, 973	C=C (aromatic ring)	Bending vibration
840, 808	840, 808	840, 809	840, 808	Aromatic C–H	Out-of-plane bending
452	452	452	452	Ca–O	
	570	570	570	Fe–O	

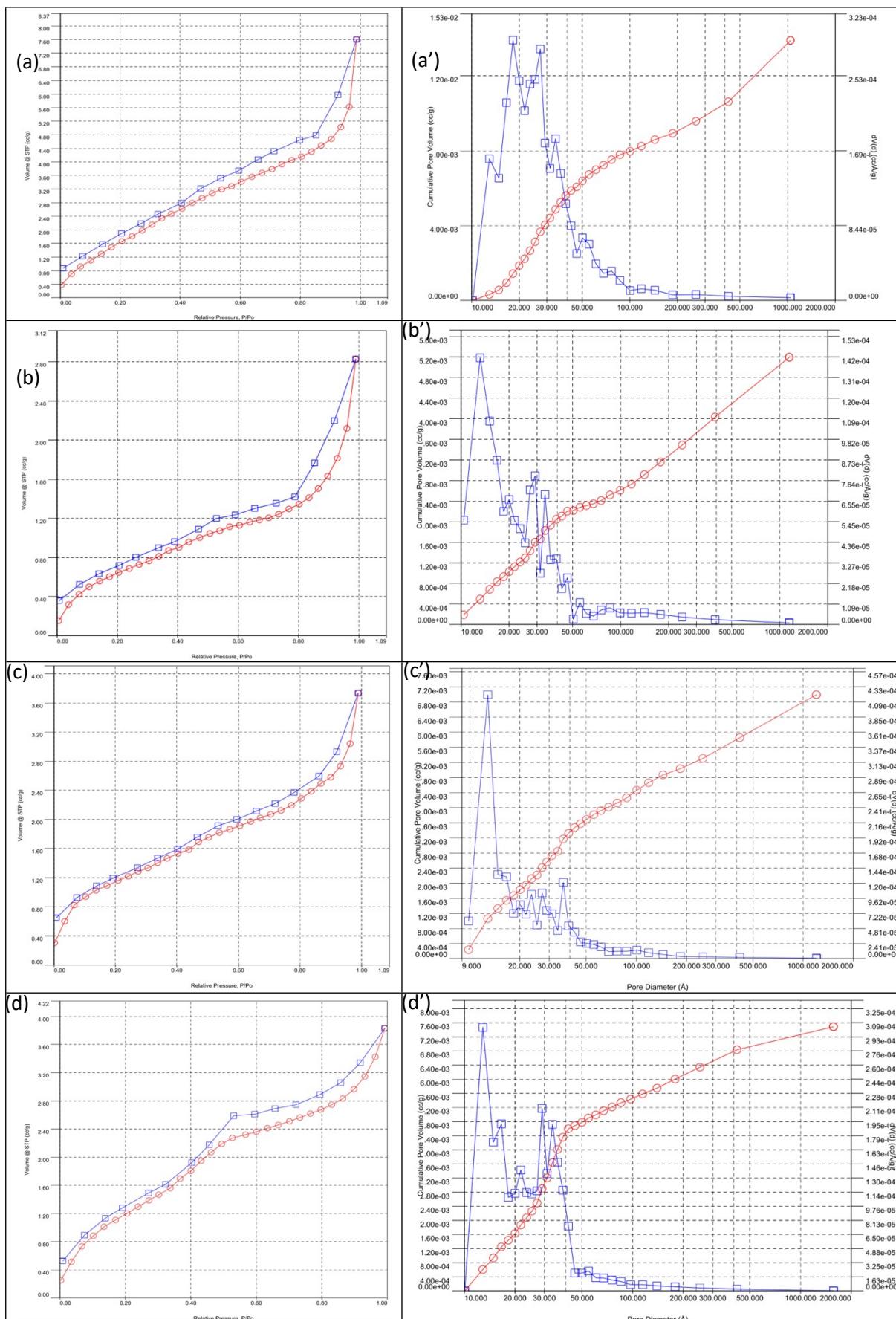


Fig. S1. Nitrogen adsorption-desorption isotherms (a-d) and BJH pore diameter distributions (a'-d') of the samples ACB (a, a'), MACB (b, b'), Ni/MACB (c, c'), and Ag/Ni/MACB (d, d').

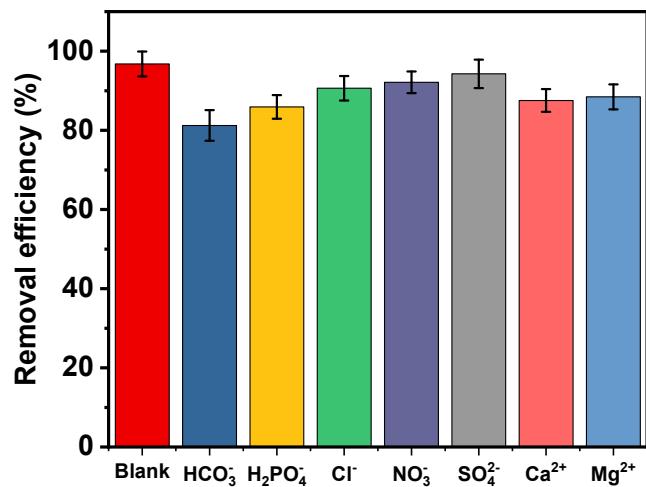


Fig. S2. Effect of coexisting inorganic ions (1 mM each) on the photo-Fenton degradation efficiency of ENR using Ag/Ni/MACB. *Experimental conditions:* $m = 8 \text{ g/L}$, $C_{\text{ENR}} = 10 \text{ mg/L}$, $C_{\text{H}_2\text{O}_2} = 0.05 \text{ mol/L}$, $pH = 7$, $T = 25 \text{ }^{\circ}\text{C}$.

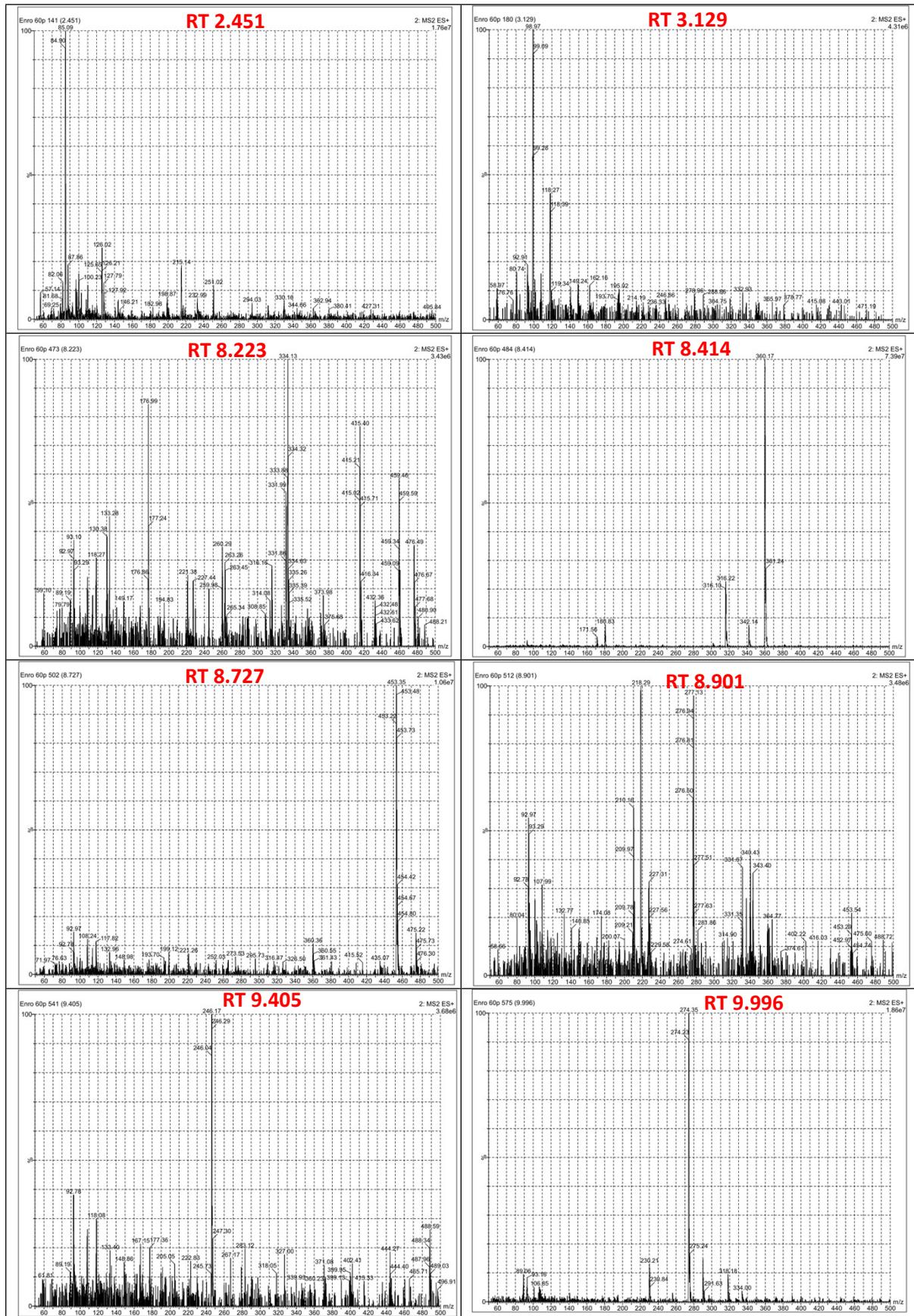


Fig. S3. Mass spectra (MS) of degradation products extracted from TIC at different retention times (RT) after 60 min of photocatalytic treatment

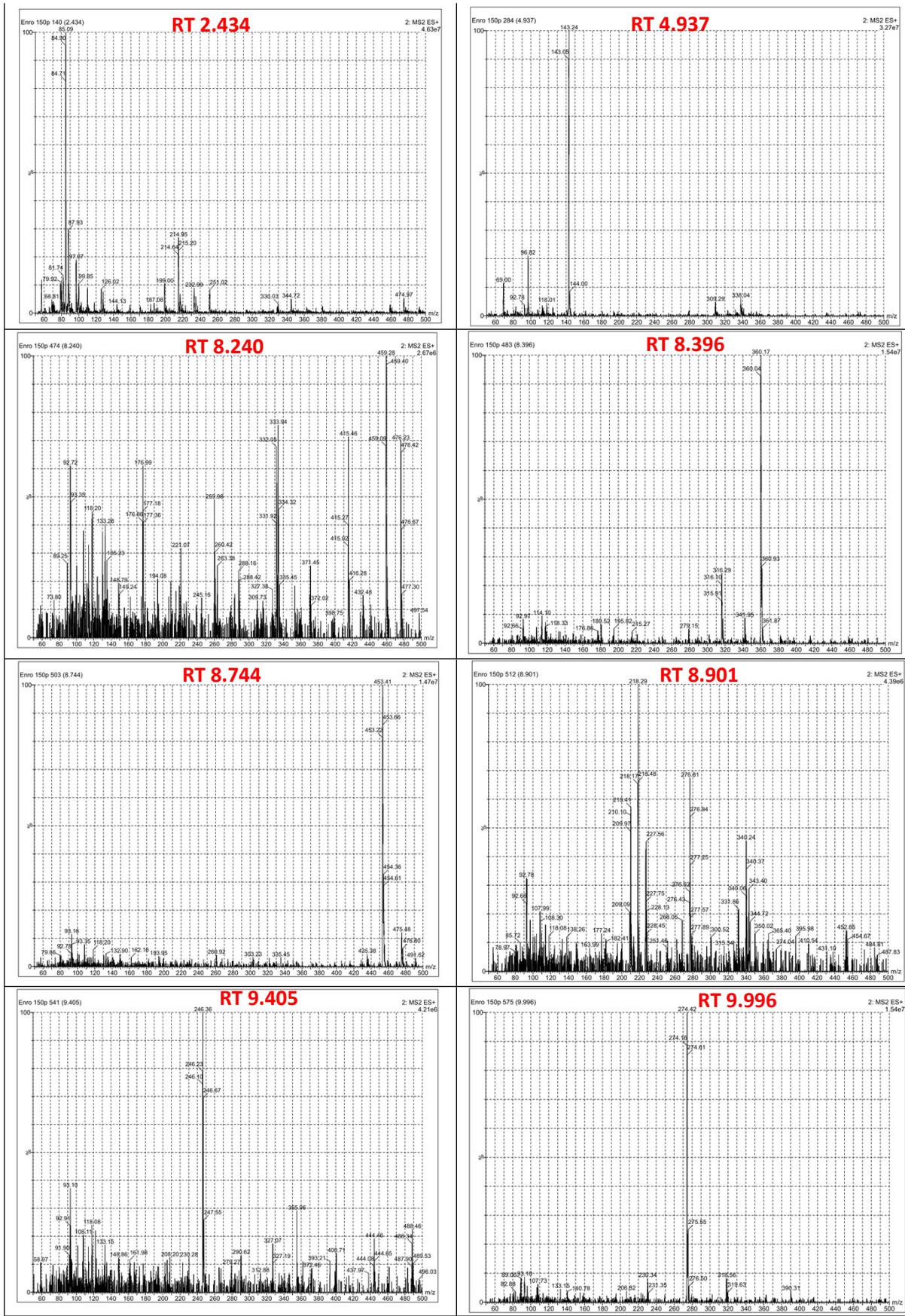


Fig. S4. MS of degradation products extracted from TIC at different RT after 150 min of photocatalytic treatment