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Enhanced chlorobenzene removal by internal magnetic field through initial cell adhesion and biofilm formation

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Supplementary materials

1. Performance evaluation of chlorobenzene

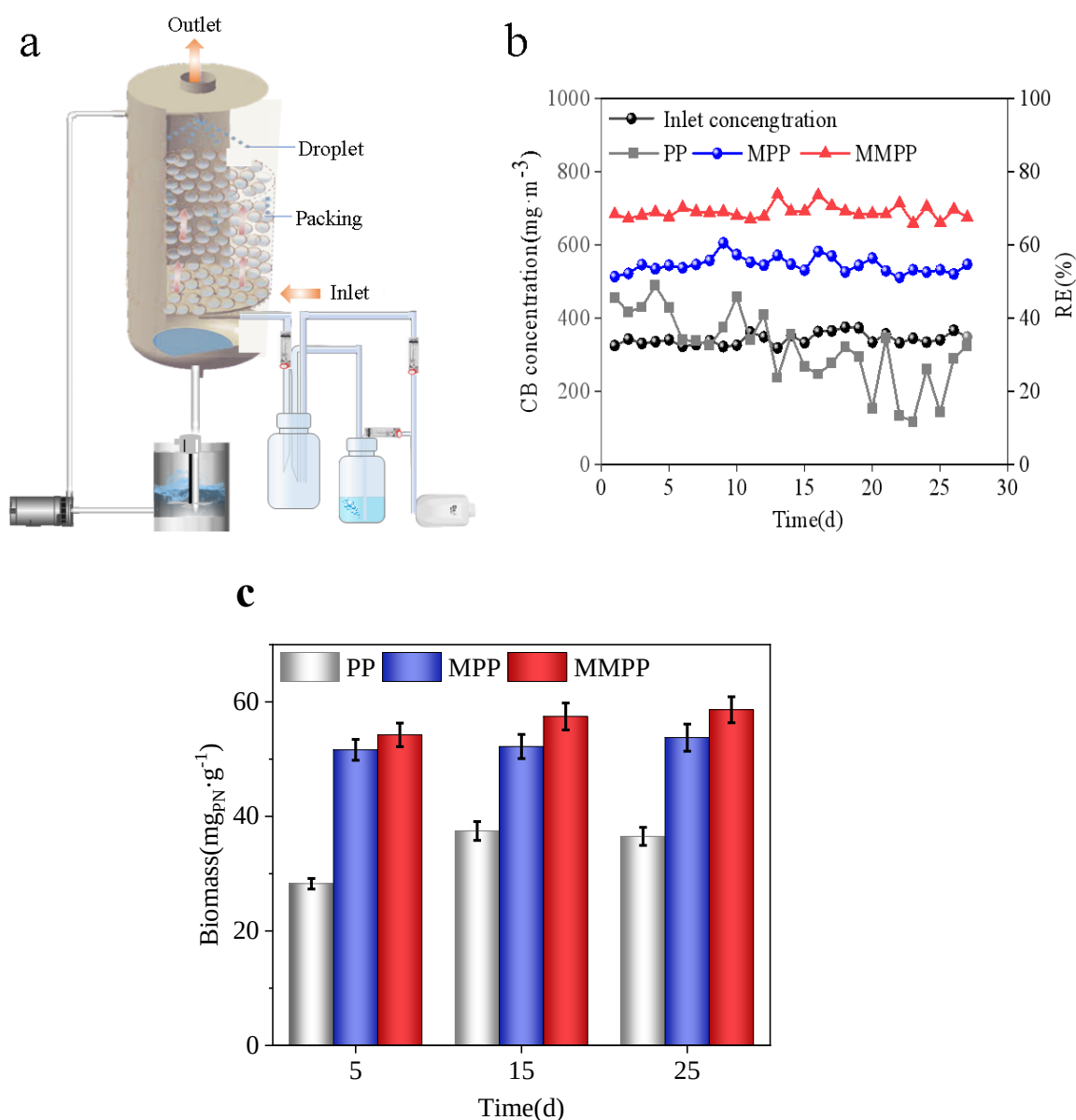


Fig. S1 Craft of the laboratory-scale bio-trickling filter (BTF) system: (a) the BTF Schematic, (b) the removal efficiency (RE) of CB with inlet concentration of 300-400 $\text{mg} \cdot \text{m}^{-3}$ at EBRT of 60 s in BTF1 (PP), BTF2 (MPP) and BTF3 (MMPP). The bio-trickling filter was constructed as a column by steel with the inside diameter of 150 mm and the height of 570 mm. The inoculum was the CB-degrading bacterium, *Ralstonia* sp. XZW-1. The liquid mineral medium was used as the nutrient with a spray rate of

5.4 L/h. The data was recorded after 14 days starting-up period. (c) the biomass (presented as protein) on the packing surface in the BTF.

2. Excitation–emission matrix spectra

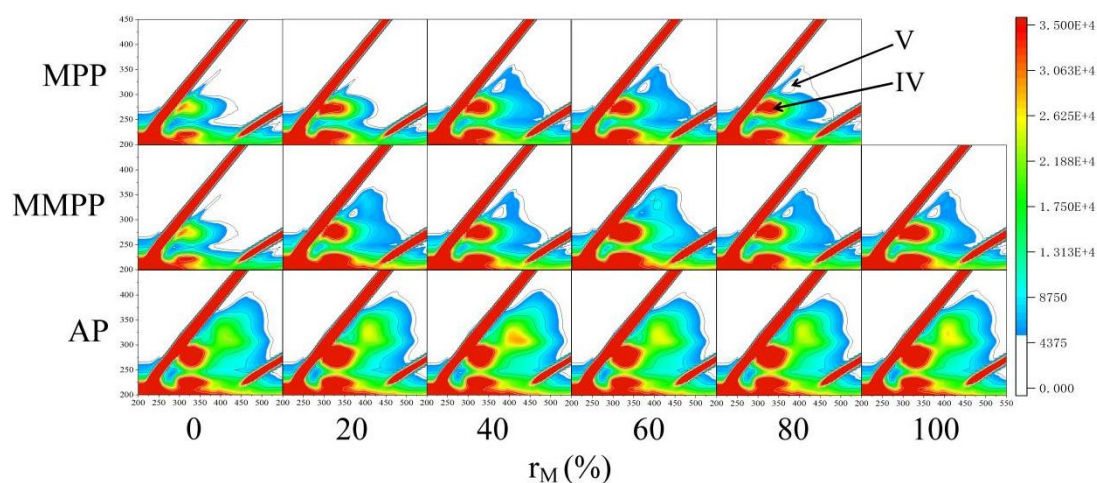


Fig. S2 Cellular characteristics under the different MFI: the three-dimensional excitation–emission matrix fluorescence spectra, where the proteoid substances (IV) represent the microbial metabolism and the humic acid (V) represent the microbial apoptosis.

3. Biodegradation kinetic analysis of CB

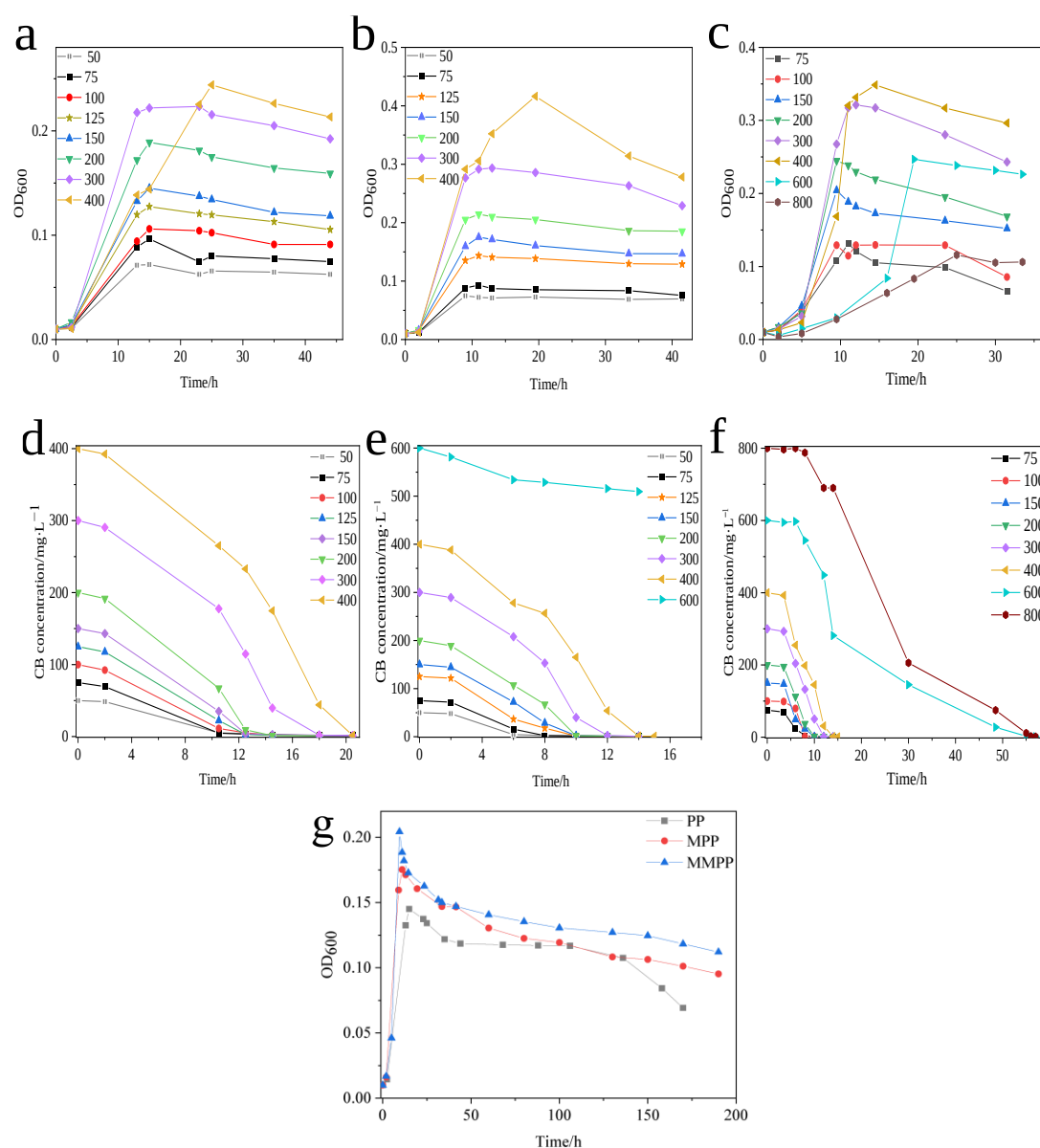


Fig. S3 The experimental data of the microbial growth and CB degradation for kinetic analysis: (a) Microbial growth cure for the PP, (b) Microbial growth cure for the MPP, (c) Microbial growth cure for the MMPP, (d) microbial biodegradation cure of the PP, (e) microbial biodegradation cure of the MPP, (f) microbial biodegradation cure of the

MMPP, (g) microbial decay cure for the packings with the concentration of 150 mg·L⁻¹.

Table S1 The calculated kinetic parameters

Packings	$\mu_{\max}$ (h ⁻¹)	$V_{\max}$ (h ⁻¹)	K_S (mg·L ⁻¹)	K_I (mg·L ⁻¹)	K_d (h ⁻¹)
PP	0.197	0.279	182.262	284.663	0.0036
MPP	0.276	0.350	107.350	157.855	0.0033
MMPP	0.470	0.455	100.003	115.249	0.0027