Supporting Information

Microplasma-assisted synthesis of mixed-valence Ce-MOF with enhanced oxidase-like activity for colorimetric sensing of dopamine

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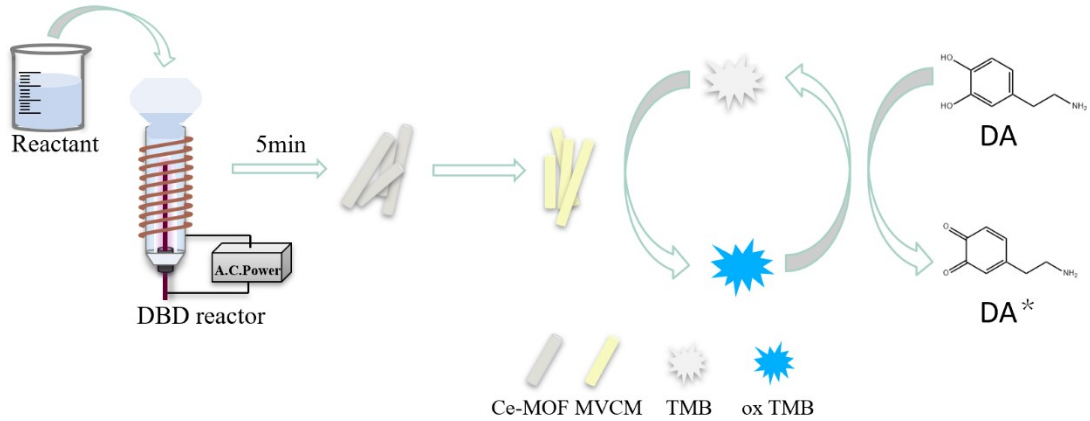

Fig. S1 Schematic illustration of the synthesis of Ce-MOF-DBD and detection of DA based on MVCM-DBD.

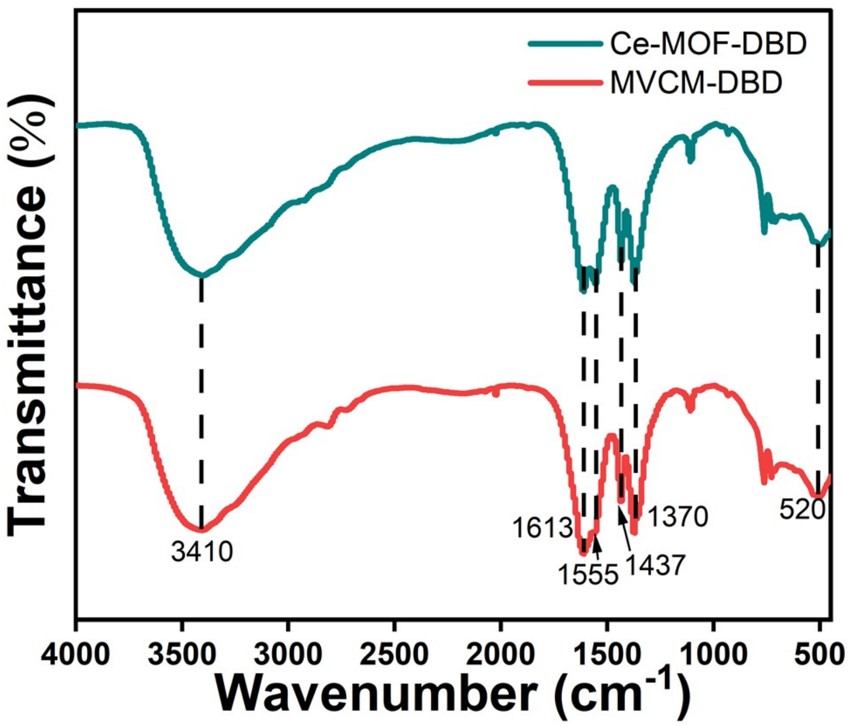

Fig. S2 FT-IR spectrum of MVCM-DBD and Ce-MOF-DBD.

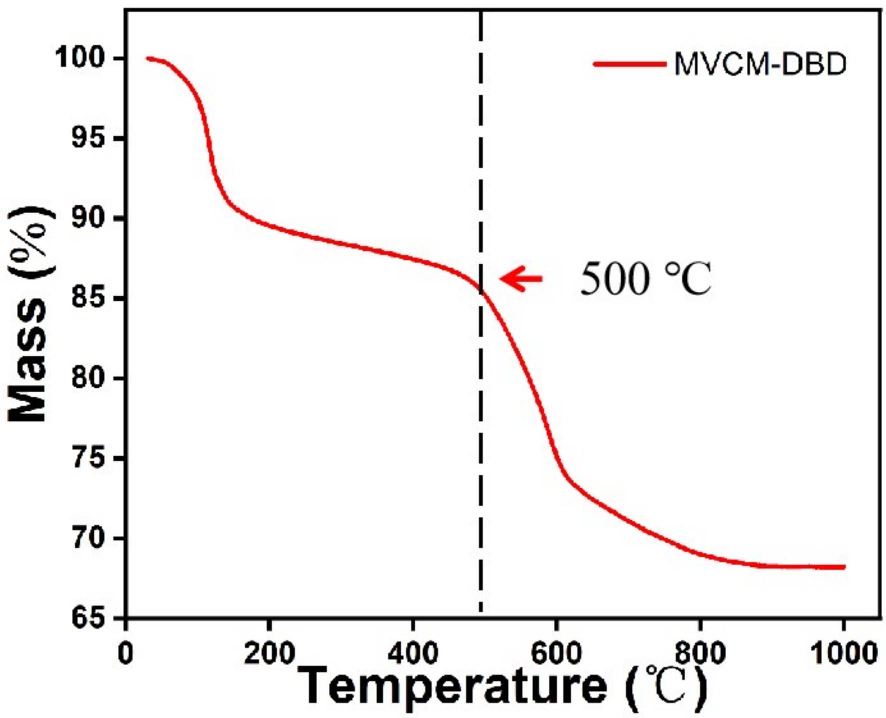

Fig. S3 TGA curves of MVCM-DBD.

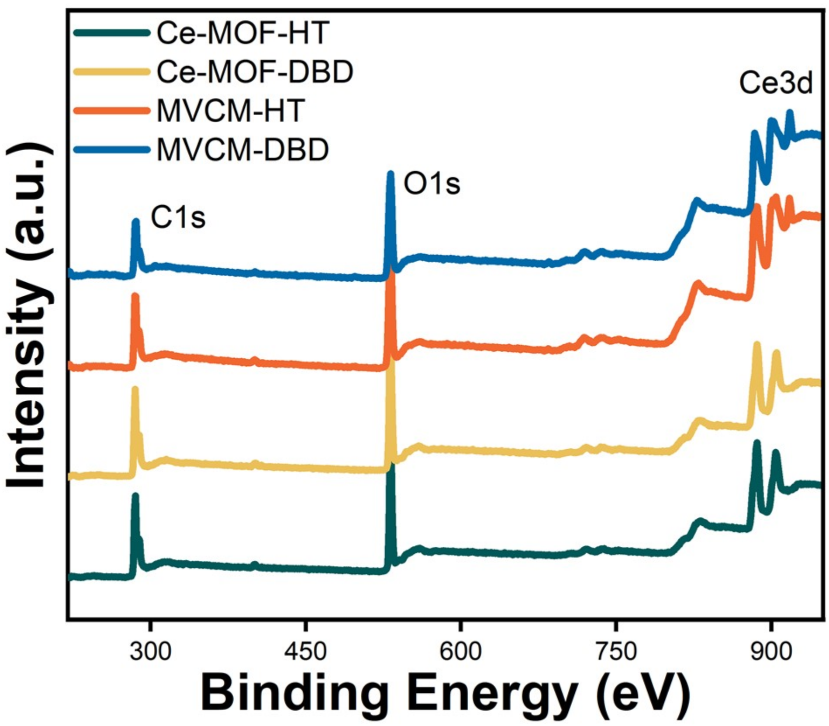

Fig. S4 XPS spectra of Ce-MOF and MVCM synthesized by microplasma and hydrothermal method.

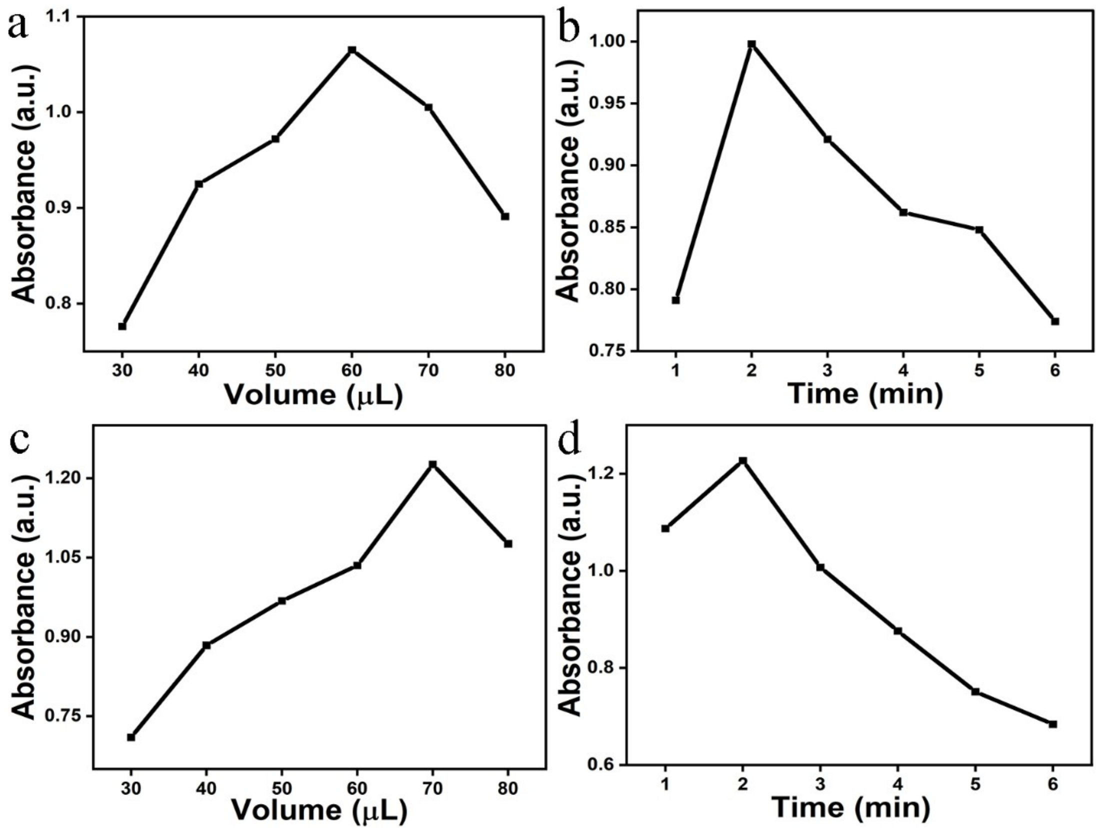

Fig. S5 (a) Effects of catalytic activities of MVCM at different synthetic conditions: the volume of NaOH /H_2O_2 mixed solution of MVCM- HT. (b) The reaction time of MVCM-HT. (c) The volume of NaOH /H_2O_2 mixed solution of MVCM- DBD. (d) The reaction time of MVCM-DBD.

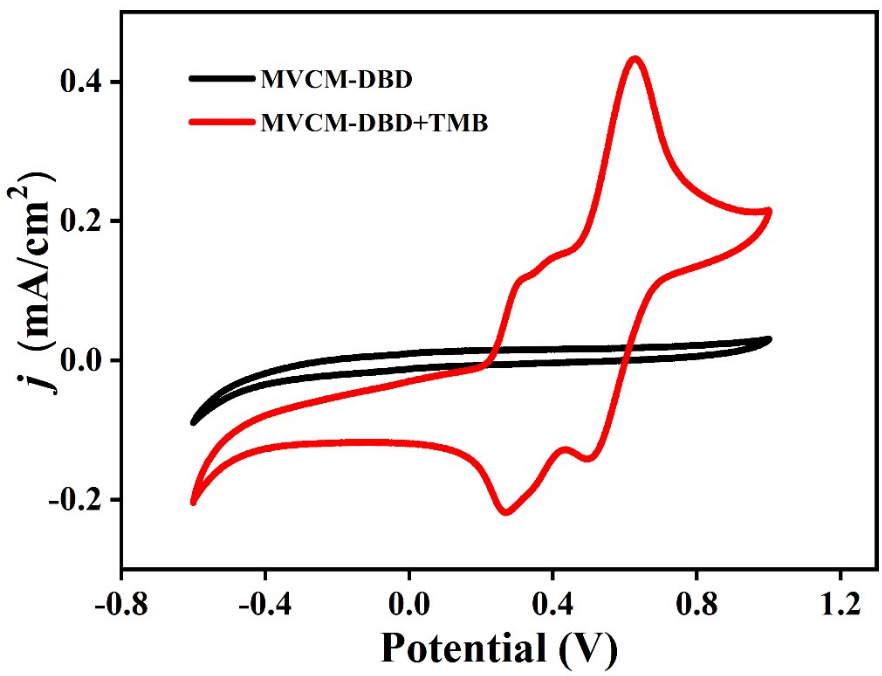

Fig. S6 Cyclic voltammograms of MVCM-DBD modified GCE of TMB solution in HAc-NaAc buffer (0.1 M, pH=4).

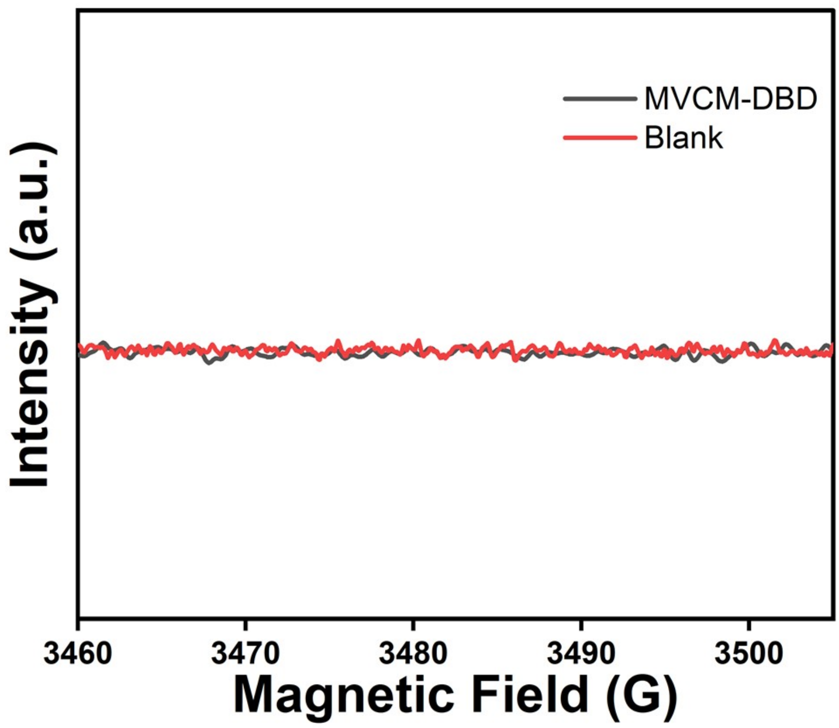

Fig. S7 EPR spectra of MVCM-DBD

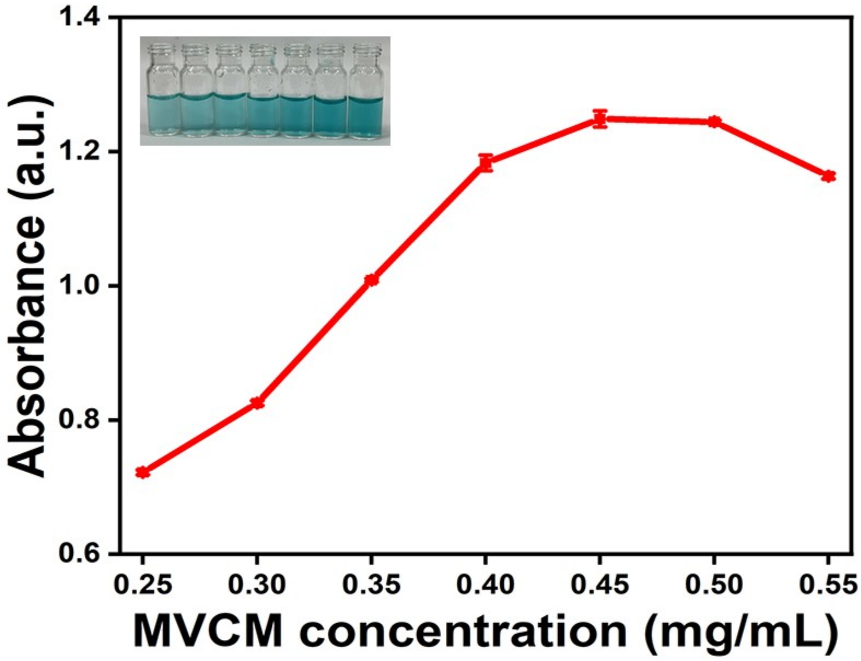

Fig. S8 optimization of the concentration of MVCM-DBD.

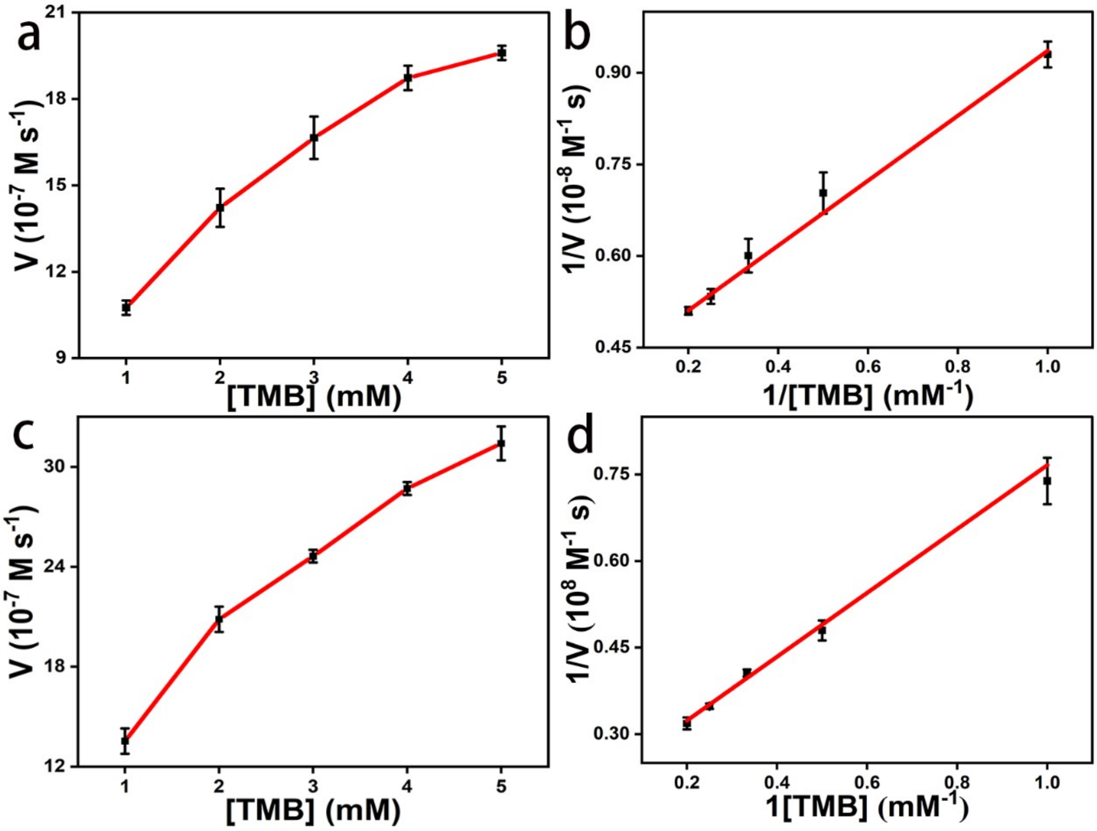

Fig. S9 Steady-state kinetic analysis of (a) MVCM-HT and (c) MVCM-DBD, double reciprocal plot of (b) MVCM-HT and (d) MVCM-DBD.

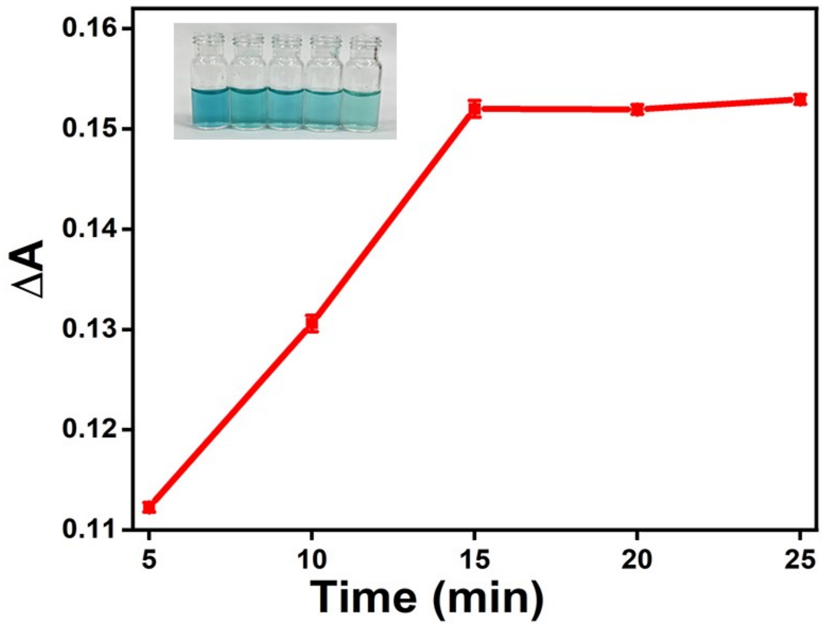

Fig. S10 optimization of DA detection reaction time.

Table S1 Comparison of detection limits and linear range of different nano materials for DA detection.

Sample No.	Materials	Methods	Linear range (μM)	Limit of detection (μM)	Ref.
1	Pt/hBNNs	Colorimetric	2-55	0.76	[1]
2	Fe_3O_4 NPs	Colorimetric	0.01-25	0.35	[2]
3	$CoFe_2O_4$/CoS	Colorimetric	0-50	0.58	[3]
4	GNR/AgNPs	Colorimetric	1-75	0.23	[4]
5	Pt/NH_2-MIL-101	Colorimetric	1-60	0.42	[5]
6	Ag NPs	Colorimetric	3.20	1.20	[6]
7	Au NPs	Colorimetric	2.5-20	2.50	[7]
8	MVCM-DBD	Colorimetric	5-100	0.74	This work

References

1. M. N. Ivanova, E. D. Grayfer, E. E. Plotnikova, L. S. Kibis, G. Darabdhara, P. K. Boruah, M. R. Das and V. E. Fedorov, *Acs Applied Materials & Interfaces*, 2019, 11, 22102-22112.
2. M. Y. Yin, S. Li, Y. Q. Wan, L. P. Feng, X. T. Zhao, S. Zhang, S. H. Liu, P. Cao and H. Wang, *Chemical Communications*, 2019, 55, 12008-12011.
3. Z. Z. Yang, Y. Zhu, M. Q. Chi, C. Wang, Y. Wei and X. F. Lu, *Journal of Colloid and Interface Science*, 2018, 511, 383-391.
4. S. Rostami, A. Mehdinia, R. Niroumand and A. Jabbari, *Analytica Chimica Acta*, 2020, 1120, 11-23.
5. J. Li, K. Y. Xu, Y. Chen, J. Zhao, P. Y. Du, L. B. Zhang, Z. Zhang and X. Q. Lu, *Chemosensors*, 2021, 9.
6. M. R. H. Nezhad, J. Tashkhourian, J. Khodaveisi and M. R. Khoshi, *Analytical Methods*, 2010, 2, 1263-1269.
7. R. Baron, M. Zayats and I. Willner, *Analytical Chemistry*, 2005, 77, 1566-1571.