Detection of chromium in different valence states in water and soil using laser-induced breakdown spectroscopy combined with ion enrichment chip

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Table S1 Flow rate (mL/min) of peristaltic pump connected and unconnected with IEC

Rotating speed levels	0	1	2	3	4	5	6
unconnected IEC	13.8	14.4	22.1	31.8	37.5	37.5	37.5
connected IEC	12.0	12.1	16.3	21.0	22.8	22.8	22.8

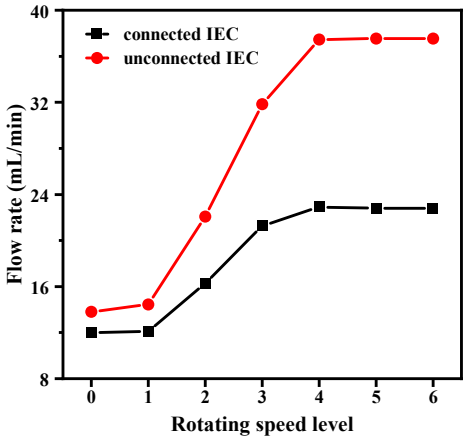

Fig. S1 Flow rate (mL/min) of peristaltic pump connected and unconnected with IEC.

Table S2 The concentration (mg/L) of total Cr, Cr(VI) and other ions.

Sample No.	total Cr	Cr(VI)	Ca^{2+}	Mg^{2+}	Cd^{2+}	Pb^{2+}	PO_4^{3-}	by-product	K^+	Cl^-	NO_3^-
1	1	0.5	0	0	0	0	0		0.3	1	0
2	1	0.5	1	1	1	1	1		1.5	5.8	1.7
3	1	0.5	5	5	5	5	5		6.5	25	8.5

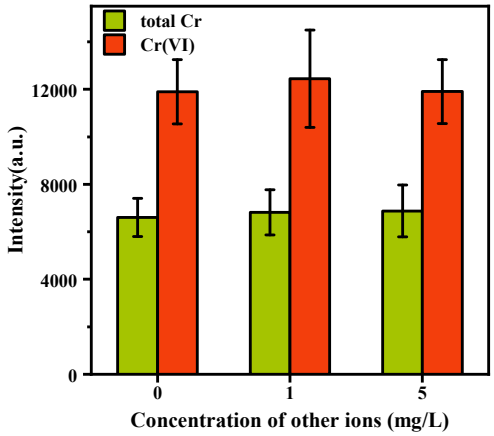

Fig. S2 The effect of different concentrations of other ions on spectral intensities of total Cr and Cr(VI).

The optimization of injection parameters of soil supernatant. We set the injection time to 5 min, and the injection speed range from 20 to 100 μL/min; the results are shown in Fig 6(a). The Cr spectral was increased with increasing injection speed from 20 to 50 μL/min and changed little thereafter. We then fixed the injection speed at 50 μL/min and varied the injection time from 2 to 10 min; the results are shown in Fig. 6(b). The Cr spectral intensity increased rapidly within 2–7 min and changed few thereafter. The results showed the influence of injection speed and injection time exceeded 50 μL/min and 7 min were little on adsorption capacity in this experiment. To reduce the load and cost of detection time, injection speed and injection time of 50 μL/min and 7 min were selected.