Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information:

Effect on ceramic grade CaF_2 recovery quality from the etching wastewater under the optimum sulfate content

Changkai Yin

Ziyang Lou

Haiping Yuan

Nanwen Zhu*

School of Environmental Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, PR China

Corresponding author: Nanwen Zhu

E-mail: nwzhu@sjtu.edu.cn

Tel: +8613916013822

1. Figures

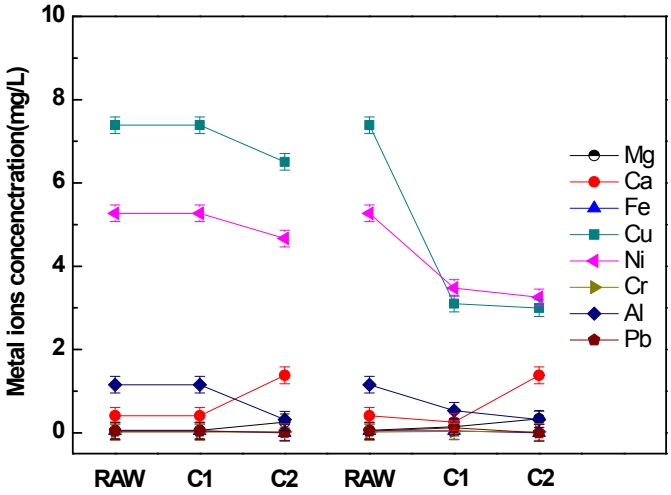

Fig.S1 Concentrations of metal ions adsorbed by 2 g/L AC (C_F=1613mg/L).

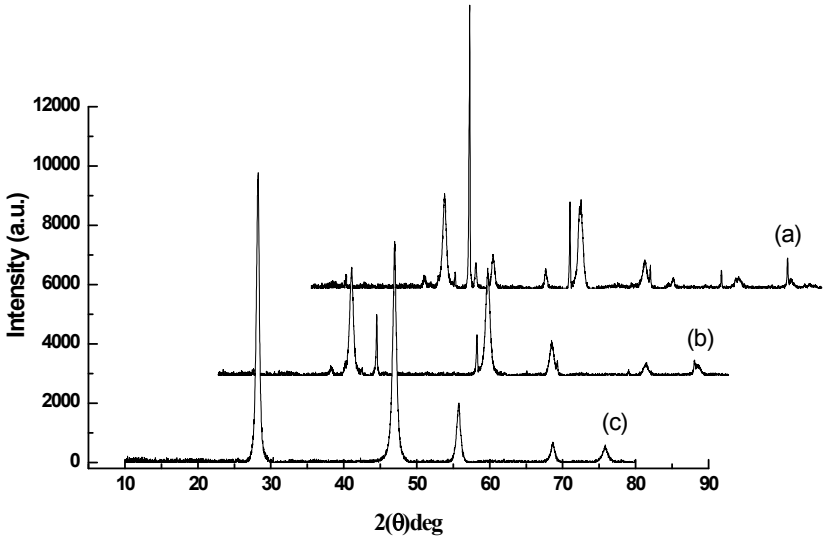

Fig.S2.XRD pattern: (a) calcium fluoride synthesized directly without pre-treatment; (b) calcium fluoride generated by calcium chloride after removal of metal ions by AC absorption (Ca/F=1.2, pH=7); (c) Ceramic grade CaF_2.

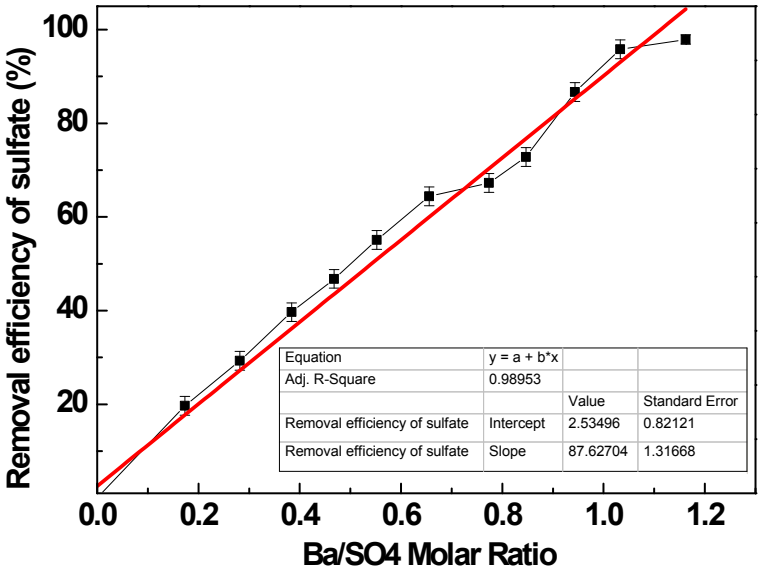

Fig.S3. Variations of removal efficiency of sulfate with Ba^{2+}/SO_4^{2-} molar ratio after 30 min of mixing time.

2. Tables

Table S1 Chemical components of CaF_2 synthesized by $CaCl_2$ after AC adsorption

Components	Weight (%)	
	Control	Experiment
CaF_2	77.5	79.7
$CaSO_4$	9.5	9.9
$Ca_3(PO_4)_2$	0.6	0.7
Other impurity	12.4	9.7

Table S2 Settlement capability analysis of CaF_2 synthesized after AC adsorption.

Runs	Turbidity(NTU)		Zeta potential(mv)	TOC(mg/L)
	0h	1h		
Control	238	17.8	24.54	35.2
Experiment	267	54.8	28.81	21.4

Table S3 Experimental conditions and chemical composites of CaF_2 production.

Run	C_F mg/L	[Ca]/[F]	pH	$C_{sulfate}$ mg/L	CaF_2 %	$CaSO_4$ %
Control	1181	1.2	6.9	398	78.6	12.4
Experiment	1181	1.2	7.1	36	92.4	0.6
Verification	1408	1.28	8.2	121	88.2	4.6