

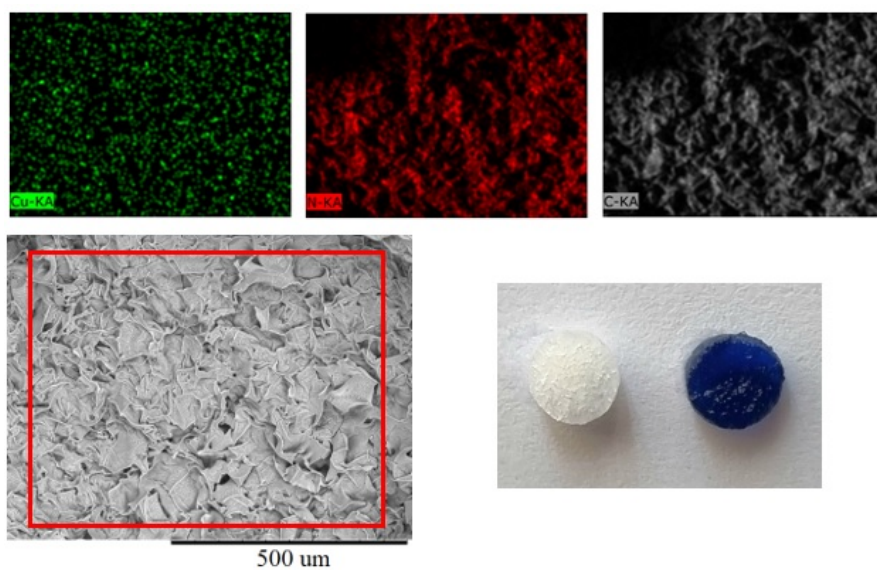
## Supplementary materials

### Extended Rate Constants Distribution (RCD) Model for Sorption in Heterogeneous Systems: 4. Kinetics of Metal Ions Sorption in the Presence of Complexing Agents. Application to Cu(II) Sorption on Polyethyleneimine Cryogel from Acetate and Tartrate Solutions

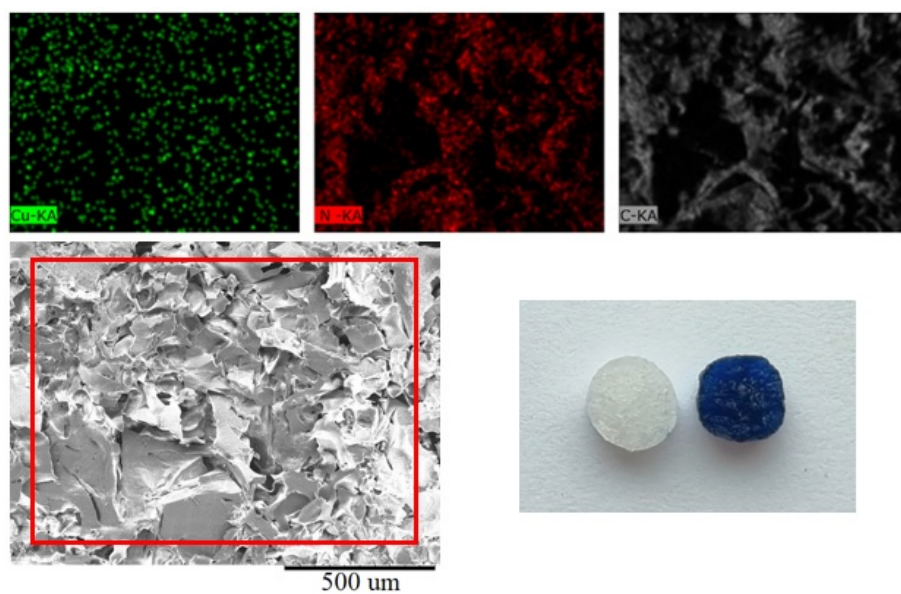
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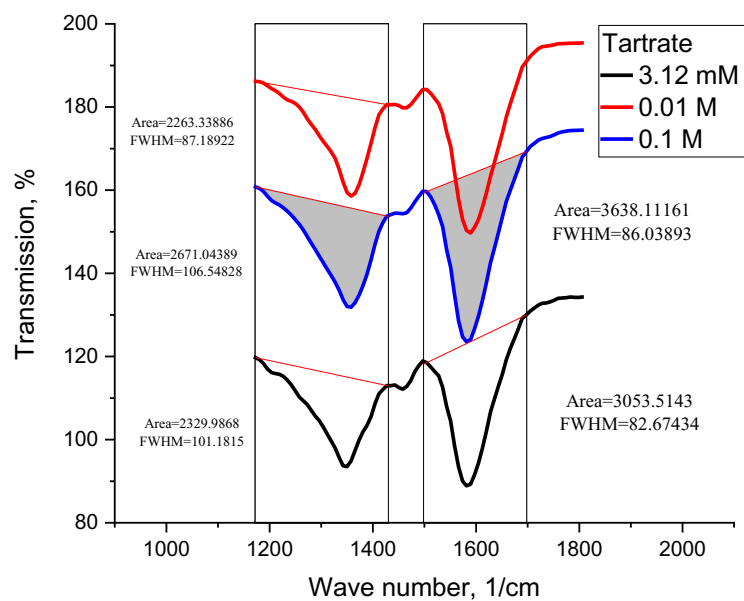


(a)



(b)

**Figure S1.** SEM images, EDX maps and photos before and after Cu(II) sorption from 0.1M acetate(a) and 0.1M tartrate (b) solutions.



**Figure S2.** Peak widths and areas for FT-IR spectra of PEI cryogels after Cu(II) sorption from 0.1M tartrate at 41 BV/h, 0.01M tartrate at 130 BV/h, 3.12 mM tartrate at 8 BV/h.

**Table S1.** Tylor series coefficients for description of Cu(II)-acetate sorption on PEI using basis RCD function for Cu(II) sorption from water

	<b>a<sub>00</sub></b>	<b>a<sub>10</sub></b>	<b>a<sub>01</sub></b>	<b>a<sub>20</sub></b>	<b>a<sub>11</sub></b>	<b>a<sub>02</sub></b>	<b>a<sub>30</sub></b>	<b>a<sub>21</sub></b>	<b>a<sub>12</sub></b>	<b>a<sub>03</sub></b>
MeL	-0.396449	1.01422	0.236004	0.0633601	-0.0141715	-0.171757	-0.114591	-0.126626	0.0146045	0.0659919
MeL <sub>2</sub>	-0.337711	0.888904	0.391048	-0.0941893	0.0867348	-0.193622	-0.0500305	-0.140627	-0.110772	0.0997239
MeL <sub>3</sub>	-0.299943	0.966508	0.293557	0.0114103	-0.0703197	-0.0402011	-0.070993	-0.0396597	-0.0181736	0.00827892

**Table S2.** Tylor series coefficients for description of Cu(II)-tartrate sorption on PEI using basis RCD function for Cu(II) sorption from water

	<b>a<sub>00</sub></b>	<b>a<sub>10</sub></b>	<b>a<sub>01</sub></b>	<b>a<sub>20</sub></b>	<b>a<sub>11</sub></b>	<b>a<sub>02</sub></b>
MeL	-0.063	1.14247	0.109306	0.390001	-0.0218159	0.0152271
MeL <sub>2</sub>	-0.35821	0.996755	0.251395	0.286133	0.315041	-0.298722
MeL <sub>3</sub>	-0.274294	1.00252	0.0908478	0.285833	-0.0150183	-0.104897
MeL <sub>4</sub>	-0.185573	1.04245	0.00929065	-0.132211	-0.0137171	-0.161819

**Table S3.** Cu(II) speciation in tartrate solutions (assuming presence of bi-nuclear complexes), pH=5.2. Calculations performed using Phreeqc Interactive 3.7.3-15968 software\*

		Cu 100 mg/l, Tartrate 0.1 M	Cu 200 mg/l, Tartrate 0.1 M	Cu 100 mg/l, Tartrate 0.00312 M
L=Tartrate	Cu <sup>2+</sup>	4.71e-3%	5.83e-3%	46.5%
	[CuL]	2.46e-2%	2.72e-2%	41.9%
	[CuL <sub>2</sub> ] <sup>2-</sup>	0.233%	0.239%	11.1%
	[CuL <sub>3</sub> ] <sup>4-</sup>	1.43%	1.42%	0.236%
	[CuL <sub>4</sub> ] <sup>6-</sup>	98.3%	98.3%	7.20e-3%
	[Cu <sub>2</sub> L <sub>2</sub> ] <sup>0</sup>	3.68e-6%	9.06e-6%	7.45%
	[Cu <sub>2</sub> L <sub>3</sub> ] <sup>2-</sup>	2.53e-6%	5.76e-6%	0.138%
	[Cu <sub>2</sub> L <sub>4</sub> ] <sup>4-</sup>	2.05e-6%	4.51e-4%	3.69e-2%

\* Cumulative complex stability constants logarithms for bi-nuclear complexes were taken from [1]

#### References

1. Bottari, E.; Liberti, A.; Rufolo, A. On the Formation of CuII-Tartrate Complexes in Acid Solution. *Inorganica Chim. Acta* **1969**, 3, 201–206, doi:10.1016/s0020-1693(00)92480-0.