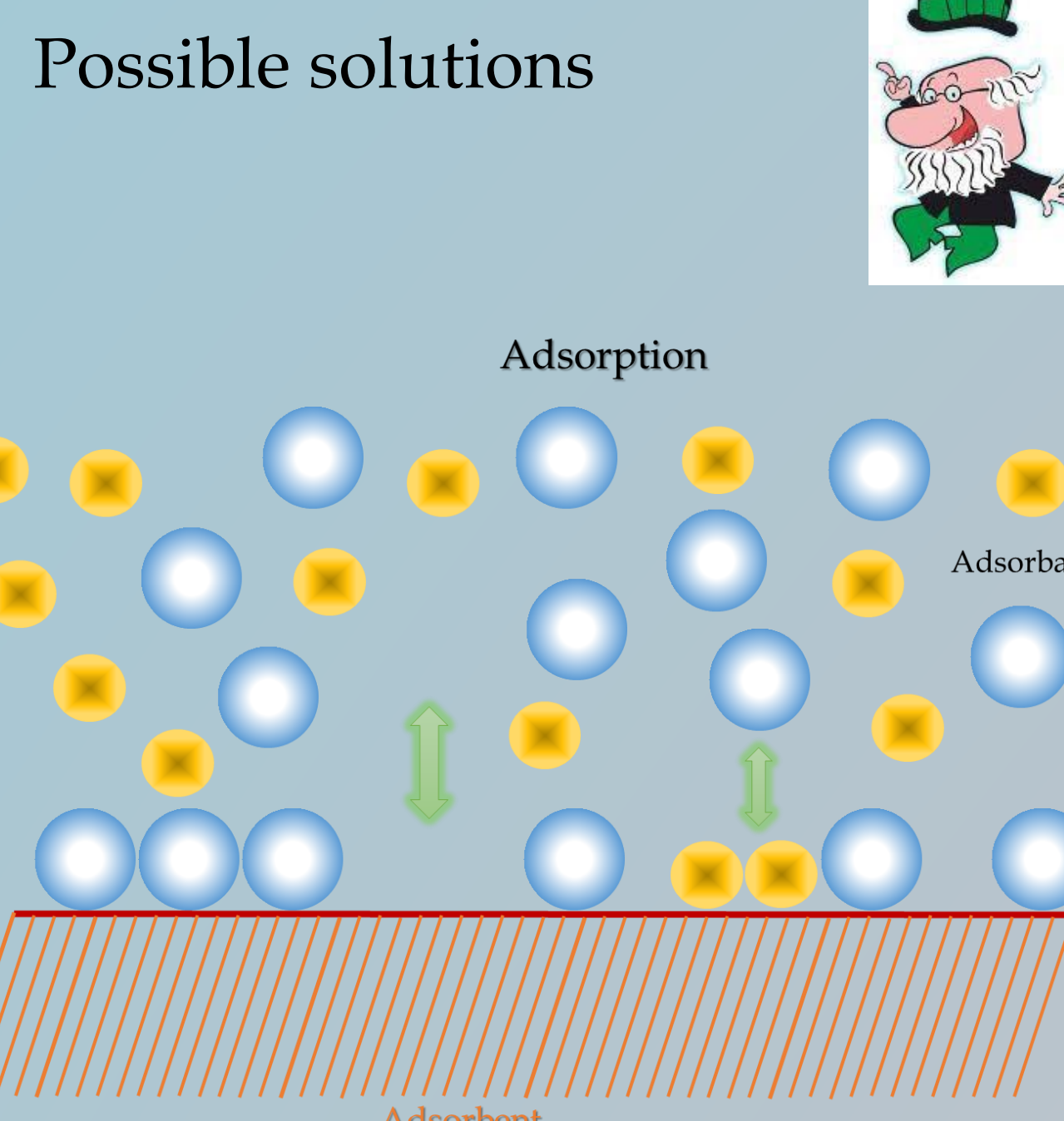
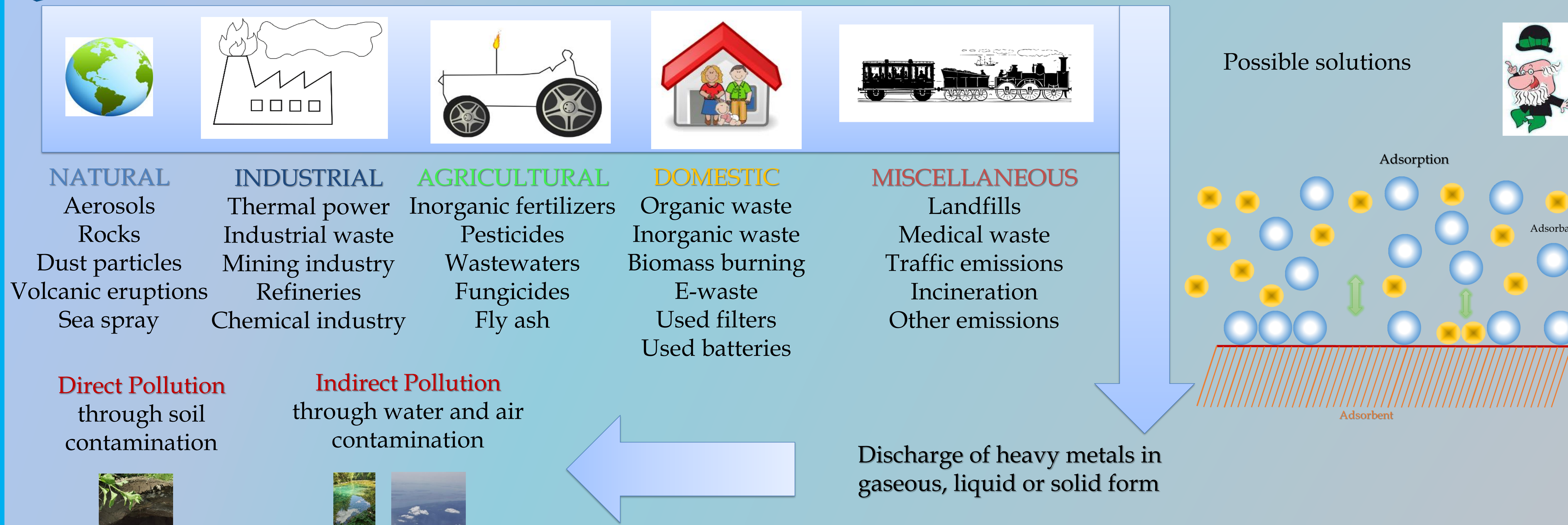


SORPTION OF COPPER, COBALT AND NICKEL IONS FROM TERNARY SOLUTIONS ON THE ZEOLITE 13X

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An alarming environmental problem is heavy metal ions pollution.



Experimental data and sorption efficiency obtained for the sorption of copper, cobalt and nickel ions on the zeolite 13X

c_0 (mmol/L)	5.072	6.188	13.679	21.119	35.006
c_e (mmol/L)	0.239	2.387	8.293	15.535	27.528
R (%)	95.288	61.425	39.374	26.441	21.362

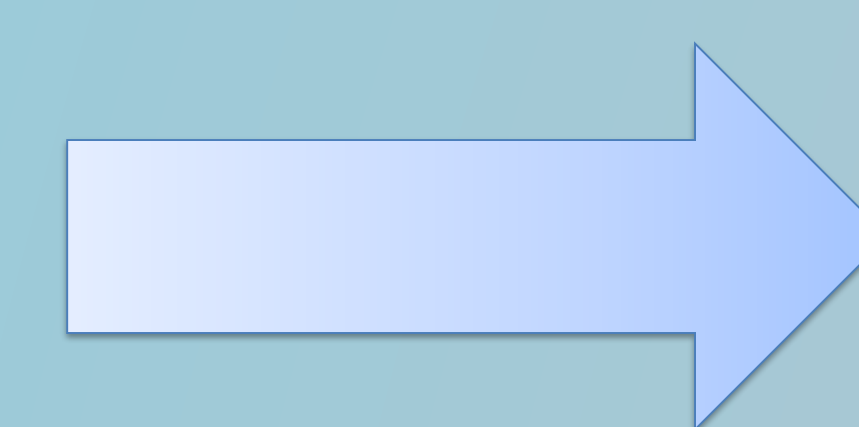
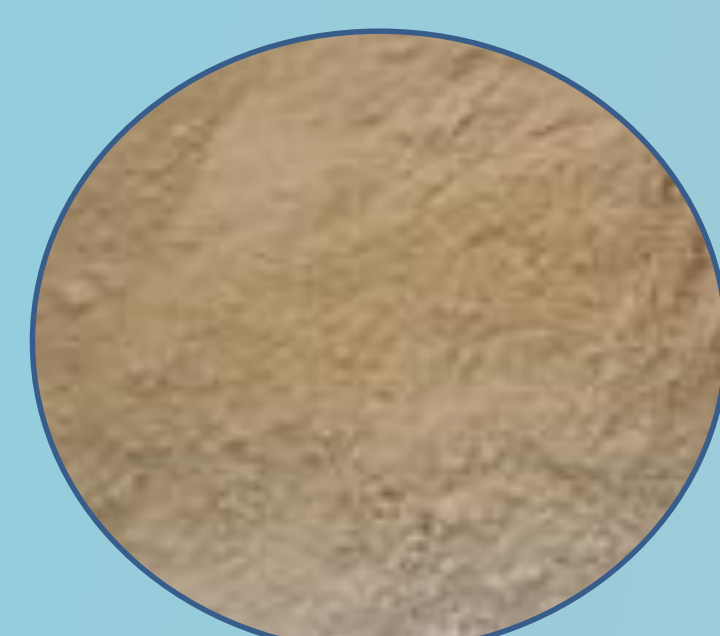
c_0 (mmol/L)	4.978	12.752	15.899	20.989	33.894
c_e (mmol/L)	3.068	11.014	13.835	18.768	31.559
R (%)	38.369	13.629	12.982	10.582	6.889

c_0 (mmol/L)	5.994	16.215	27.192	34.144	69.915
c_e (mmol/L)	3.851	12.847	25.386	32.593	68.023
R (%)	0.429	0.674	0.361	0.310	0.378

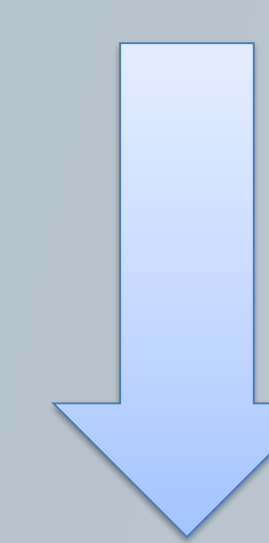
INTRODUCTION



+



Equilibrium:
 300 K
 200 rpm
 72 h

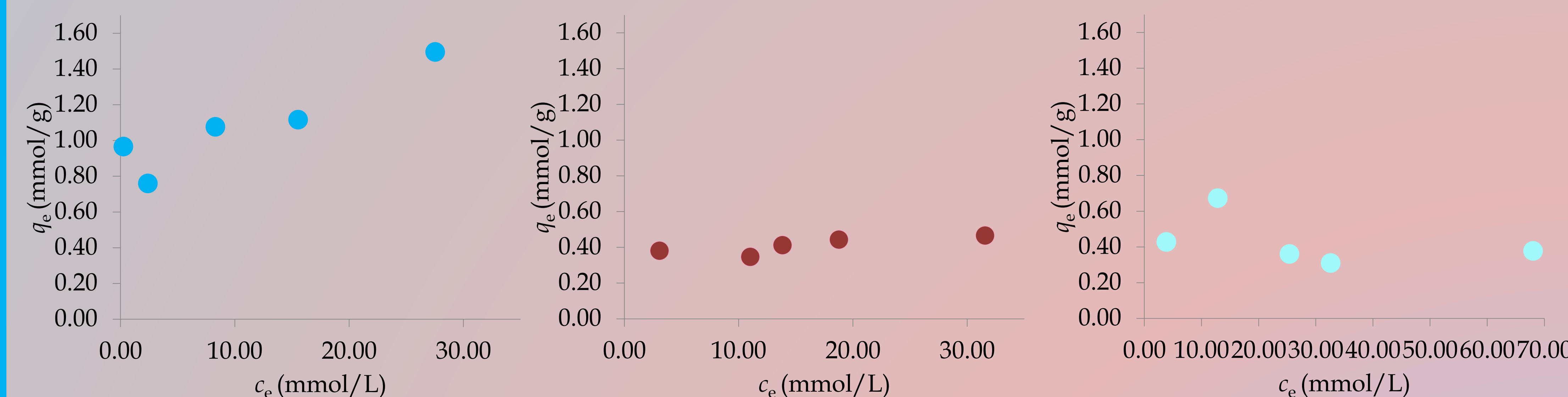


$$q_{e,t/k} = \frac{(c_0 - c_{e,t/k}) \cdot V}{m}$$

$$R = \frac{(c_0 - c_{e,t/k})}{c_0} \cdot 100$$



RESULTS



The sorbed amount of copper, cobalt and nickel ions in dependence of the equilibrium concentrations of metal ions that remained in the solutions

TO SUM UP

The sorption efficiency of zeolite 13X for all heavy metal ions (copper, cobalt and nickel ions) from the ternary solutions decreases as the initial concentrations are increased. The experiments conducted showed that the best sorption efficiency was achieved for the removal of copper ions and was $\approx 95\%$ for the lowest initial concentration of copper ions in the ternary solution.

METHODS