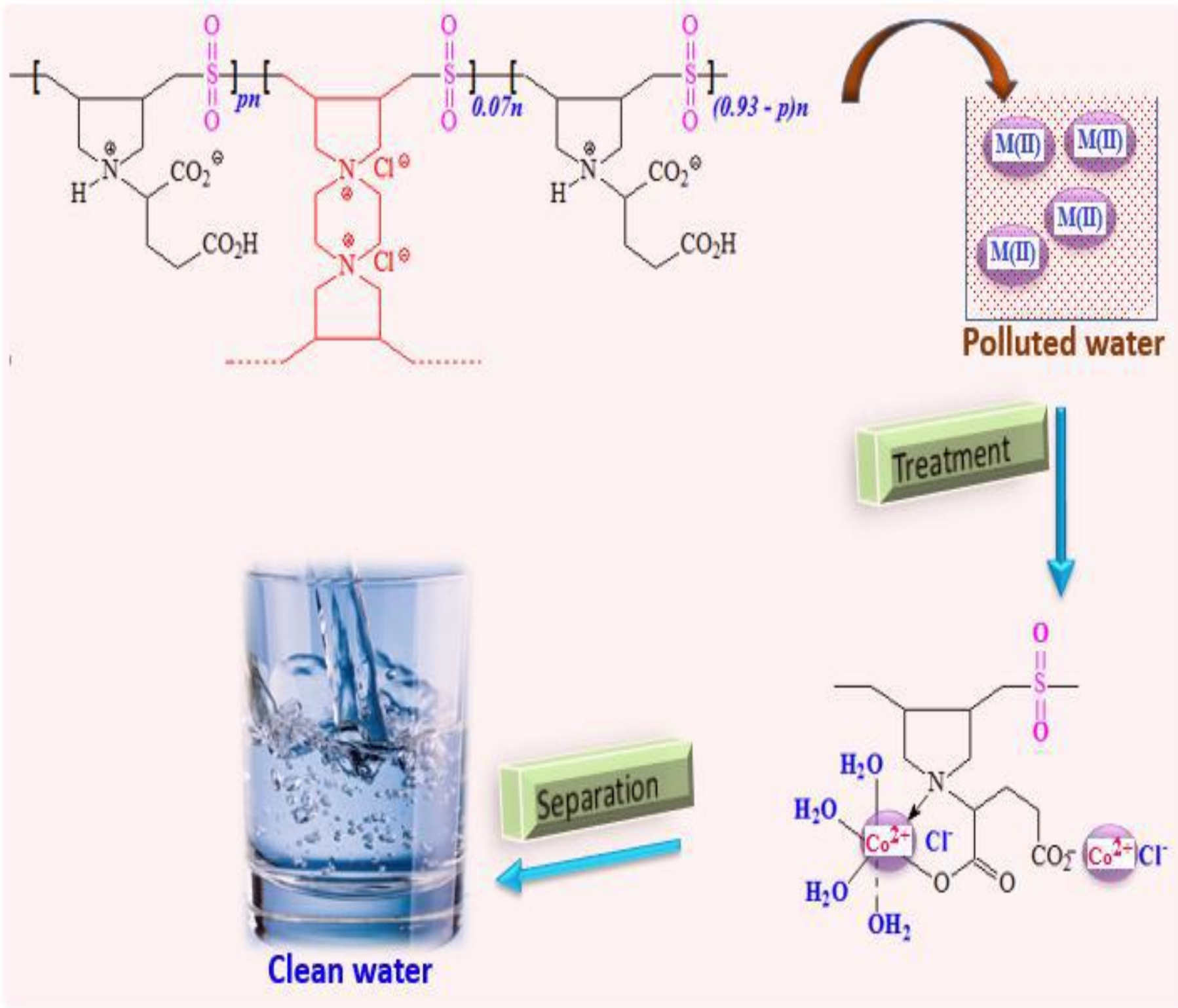


Abstract & Introduction

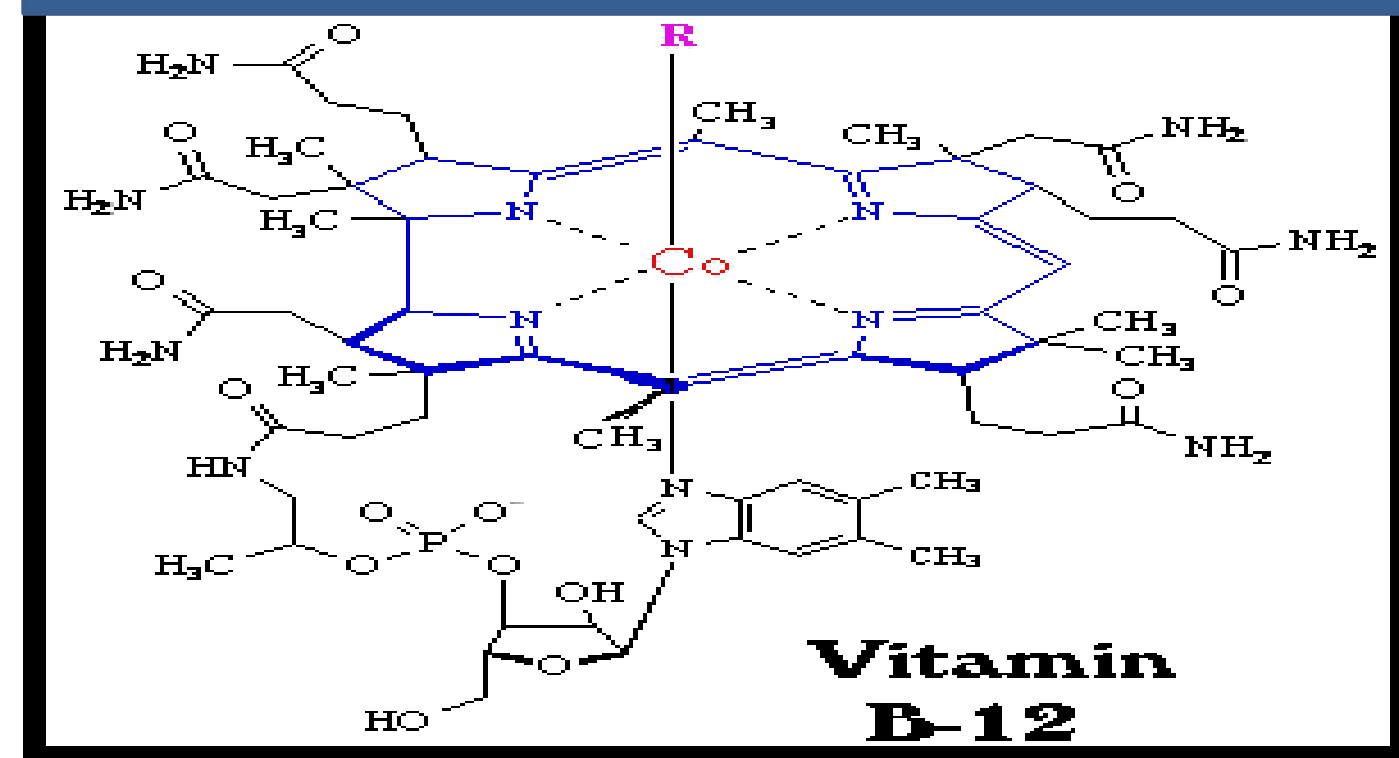


A novel resin embedded with biogenic glutamic acid residues to chelate toxic metal ions

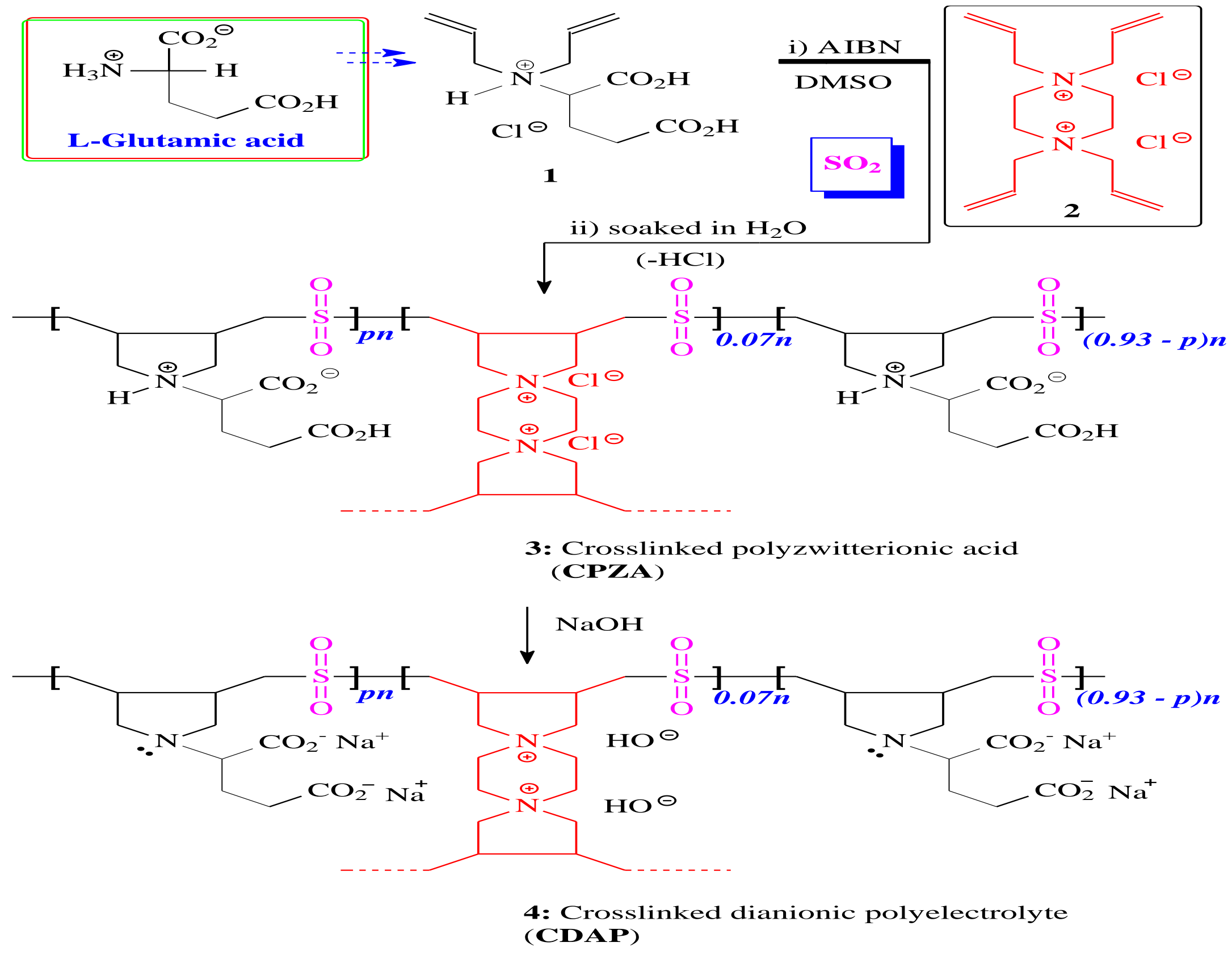
Key Facts: US DHHS¹



Motivation



Resin Synthesis



Scheme 1: Synthesis of Glutamic Acid-based CDAP Resin

Application of the Resin on Co Wastewater

Cobalt Model Wastewater:

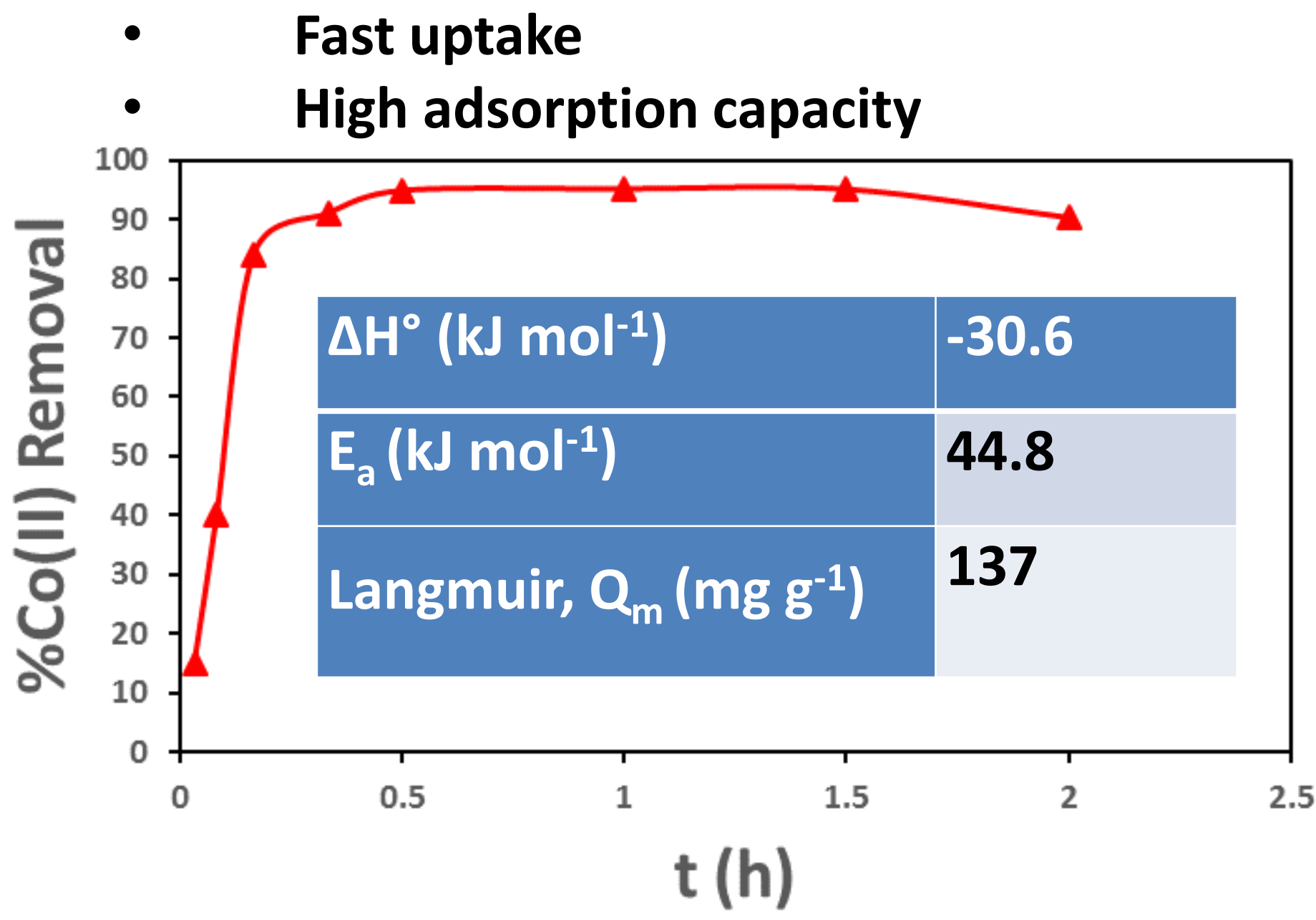


Fig. 1. %Co(II) vs time for 100 ppm [Co(II)]

Cobalt Real Wastewater:

- Very good multi-element performance
- Dual Cationic/Anionic Activity
- Consistency in both spiked/unspiked WW

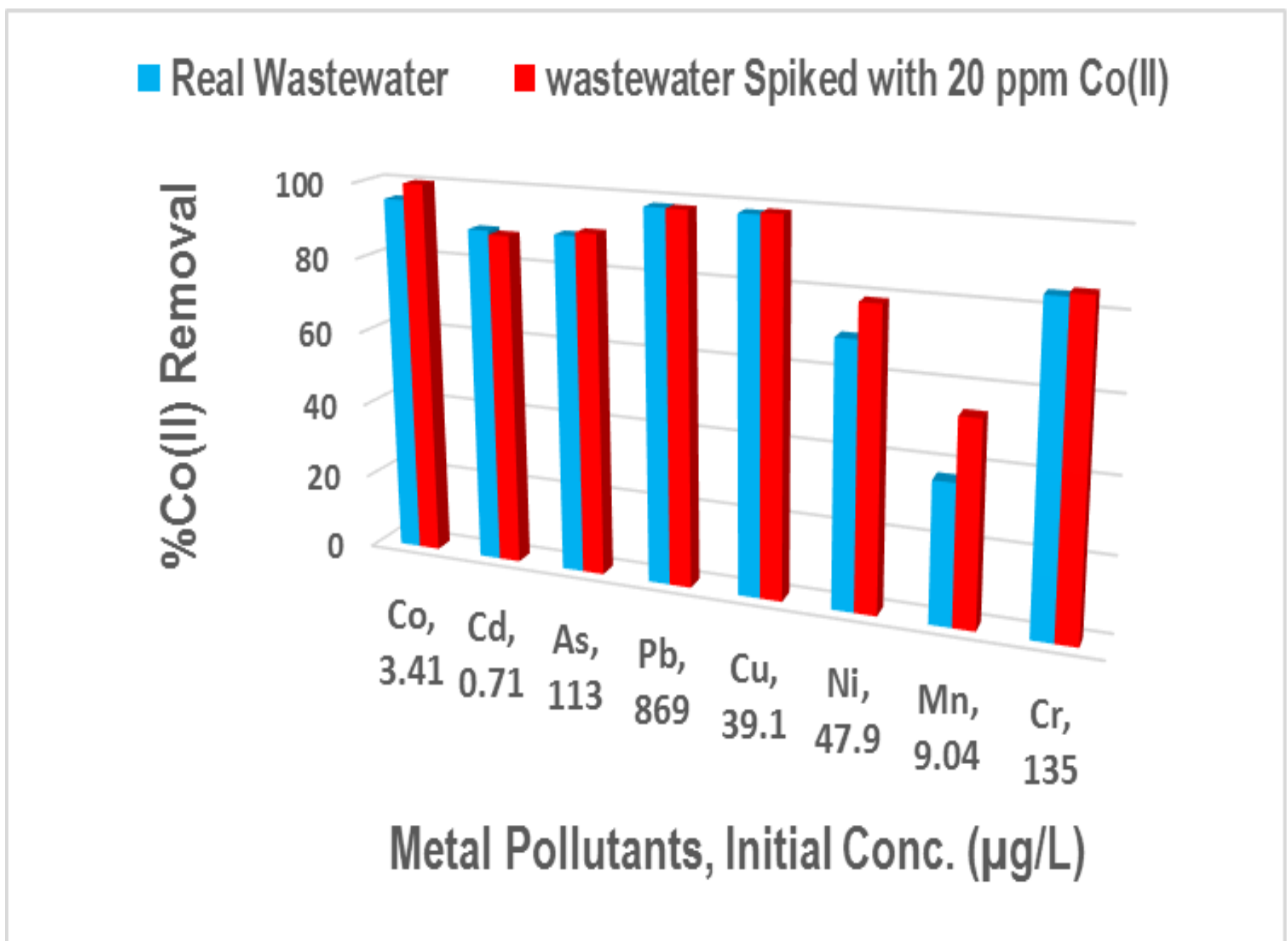


Fig. 2. % Metal Removal vs Initial Conc.

Regeneration of the Resin

Performance/Efficiency of Resin regeneration:

- Consistency in performance for 3 cycles
- High Regeneration Efficiency

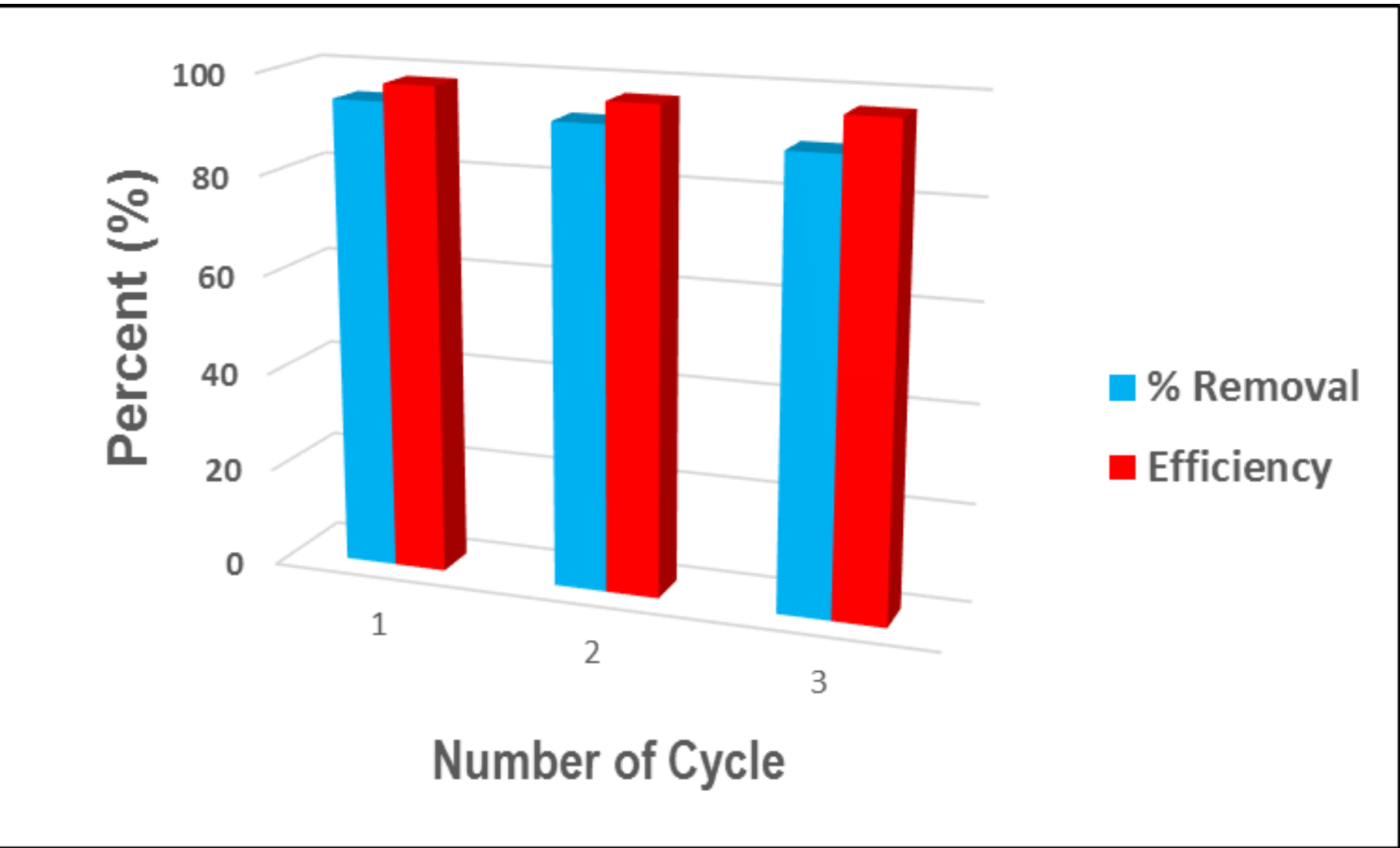


Fig. 3. Efficiency of Resin regeneration

Comparison of regenerated resin with original resin: FTIR & TGA

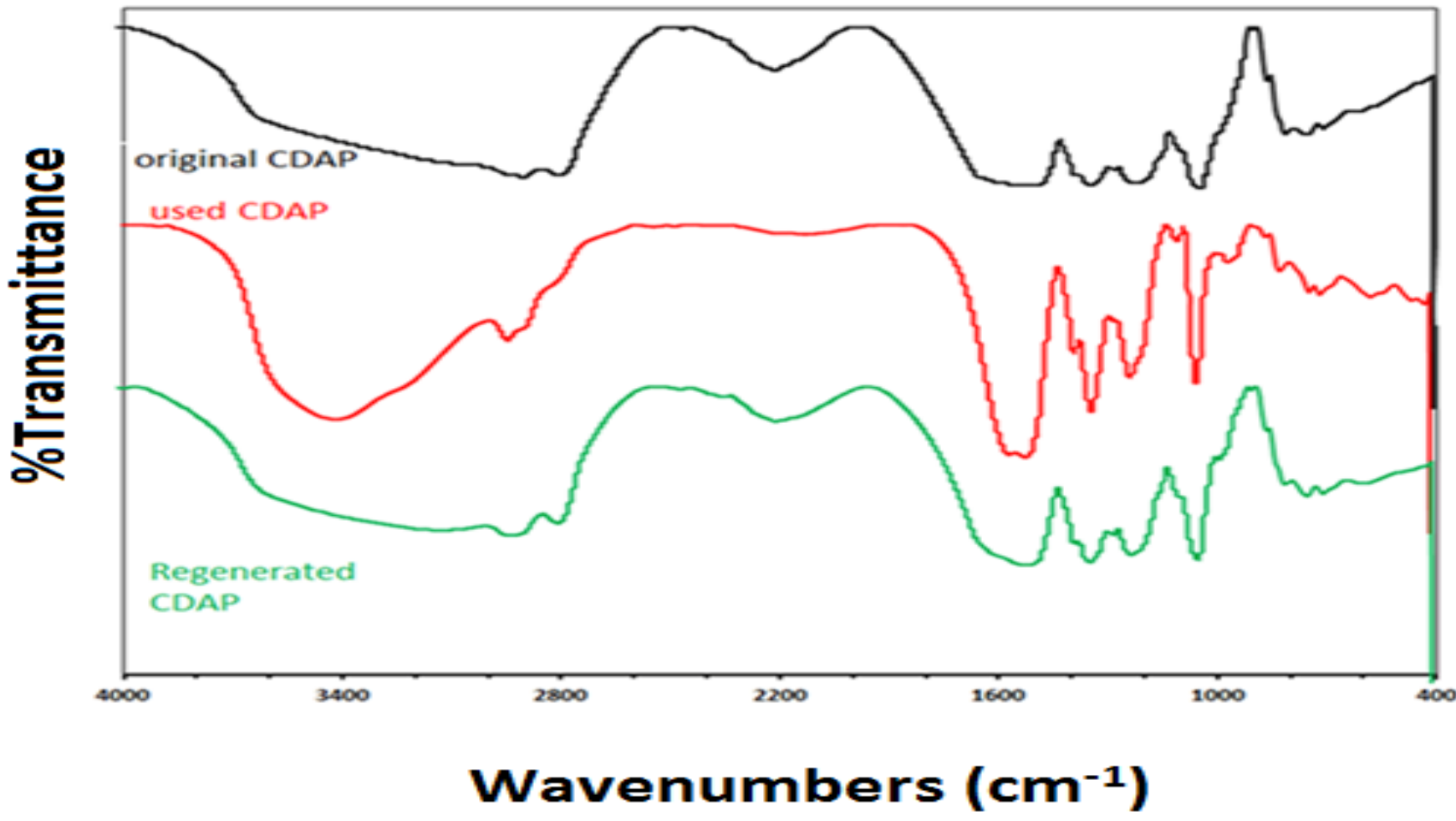


Fig. 3. FTIR Profiles of the Resins

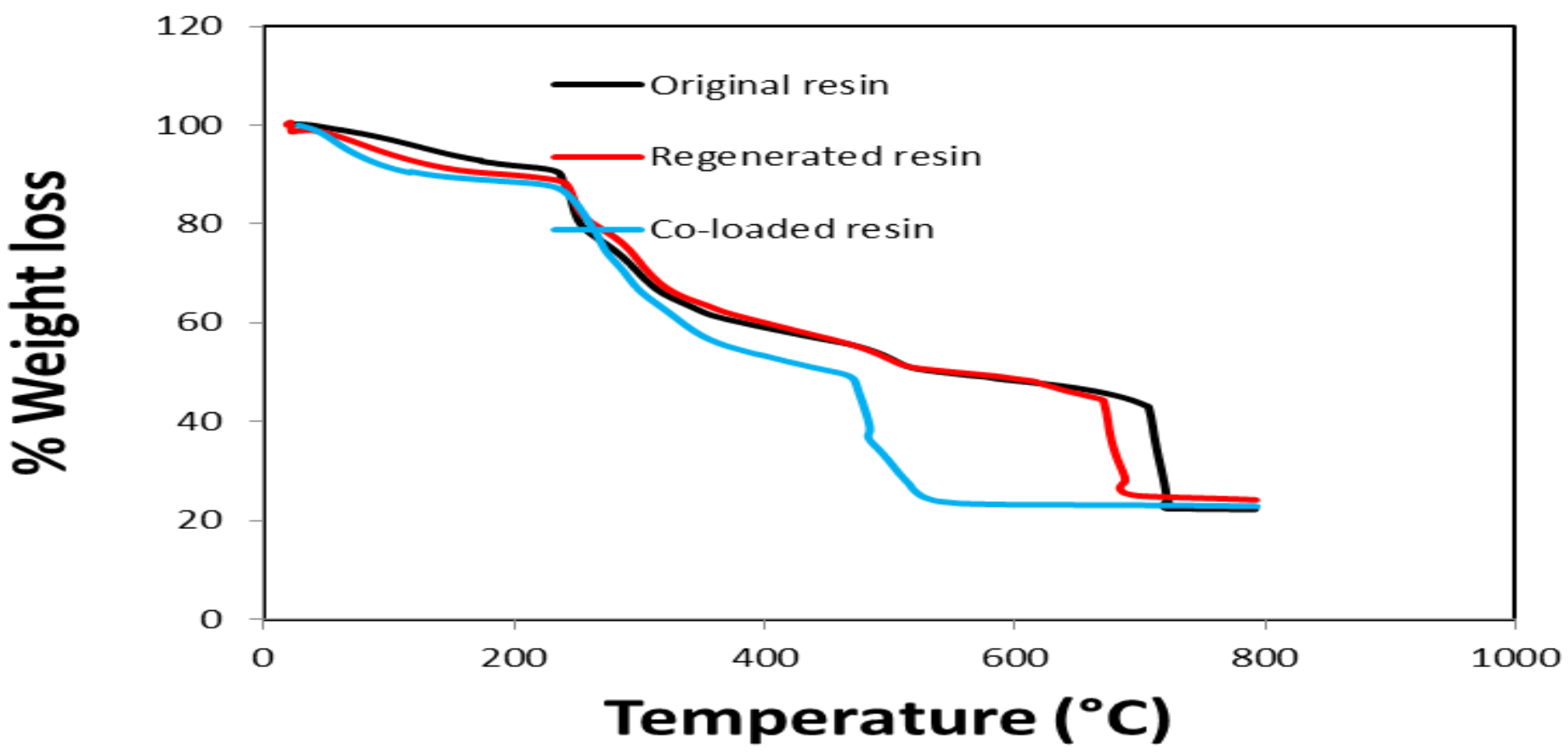


Fig. 4. TGA Profiles of the Resins

Data Analysis

Isotherm parameters for Co(II) adsorption on CDAP 4.				
Isotherms	Isotherm Parameters		R ²	APE (%)
Langmuir	Q_m	137 mg g ⁻¹	0.9872	2.21
	b	0.0828 L mg ⁻¹		
Freundlich	k_f	11.3	0.9935	4.55
	n	1.32		
Langmuir-Freundlich	q_{mLF}	138 mg g ⁻¹	0.9998	2.26
	K_{LF}	0.0817		
	m	0.98		

Table 1. Isotherm Parameters

Conclusions

- A novel GA-based resin from a biogenic source synthesized.
- The integrity of all the three original amino acid functionalities preserved while incorporating additional basic center through the SO₂ in the polymer network.
- Resin demonstrated effectiveness against both cationic and anionic pollutants in the real and model wastewater.
- Very good adsorption performance with a Langmuir monolayer adsorption capacity of 137 mg g⁻¹.
- Relative ease of regeneration of the spent resin

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References

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2. Jamiu Z. A. et al, Biogenic Glutamic Acid-based Resin: Its Synthesis and Application in the Removal of Cobalt(II), Journal of Hazardous Materials
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