



A Zr⁴⁺ MOF WITH DITHIOCARBAMATE FUNCTIONALITY SHOWING EXCEPTIONAL CAPABILITY FOR Pb²⁺ UPTAKE FROM AQUEOUS MEDIA

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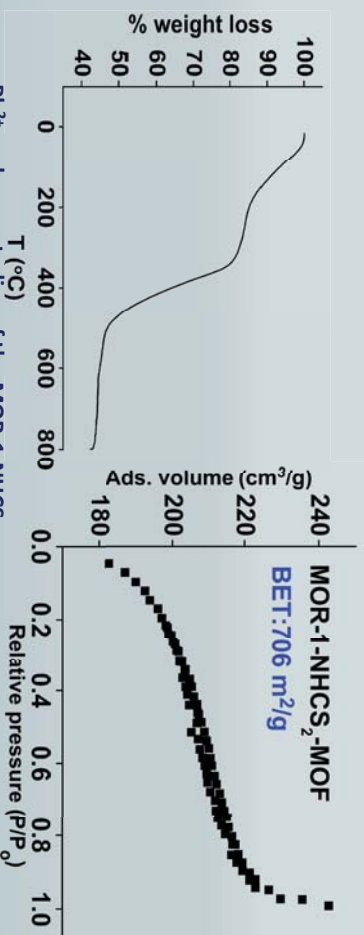
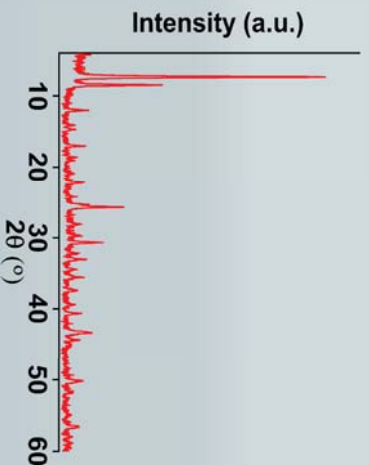
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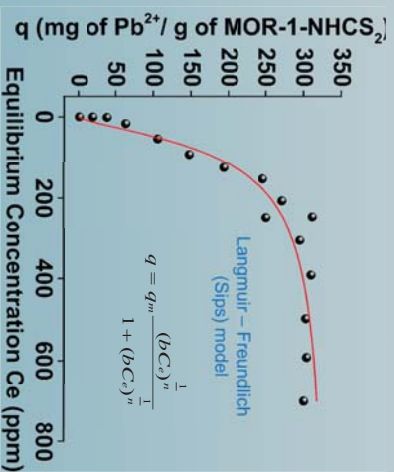
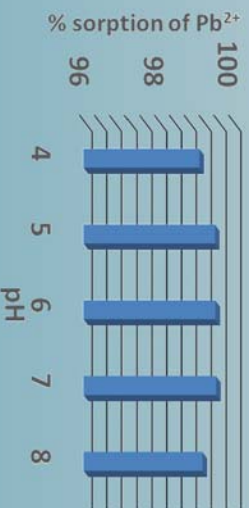
Heavy metal ions represent major contaminants for the water resources, and, especially, the pollution from Pb²⁺ is a major concern, given that Pb²⁺ can cause acute and chronic poisoning effects and targets the majority of the organs in the human body.¹ For these reasons, the elimination of lead from water systems is considered highly important in current environmental research. Recently, we reported the material [Zr₆O₄(OH)₄(NH₃⁺-BDCA)₂]Cl₆ (MOR-1), a MOF which showed exceptional capability to selectively absorb hexavalent chromium and other anionic species.² Herein, we present a post-synthetic modification of MOR-1 with CS₂, aiming in a sorbent (MOR-1-NHCS₂) with high efficiency to remove heavy metal ions from aqueous media.

Characterization of MOR-1-NHCS₂



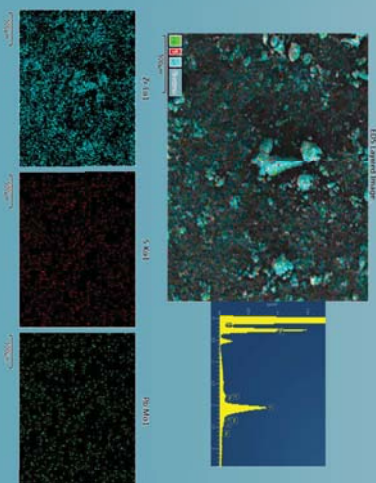
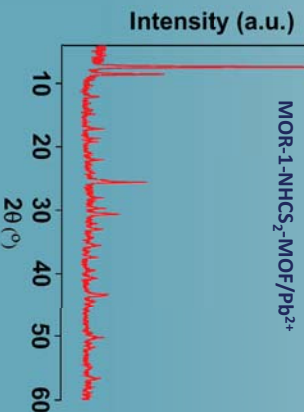
Kinetic Study

The kinetic investigations indicated that the capture of Pb²⁺ by MOR-1-NHCS₂ was remarkably fast. Interestingly, 95.6% of the initial Pb²⁺ content (C₀=1ppm) was removed within only 1 min of MOR-1-NHCS₂/solution contact.

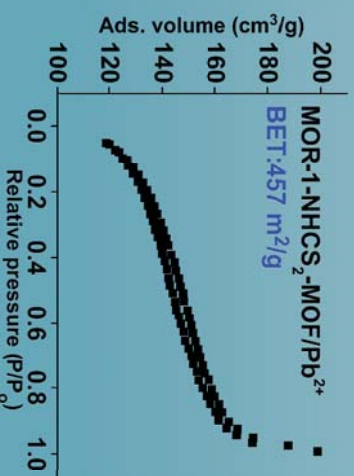


Selectivity Study

In order to investigate whether MOR-1-NHCS₂-MOF is suitable for Pb²⁺ sorption in genuine water samples, we performed tests with three bottled water solutions intentionally contaminated with traces of Pb²⁺ (initial total Pb²⁺ concentration = 1 ppm). Even in the presence of high excess of several competitive cationic species, the lead removal was found high and similar (>99%) to that determined in the absence of competitive cations.



Characterization of Pb²⁺-loaded MOR-1-NHCS₂



Acknowledgments

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References

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Ευρωπαϊκή Ένωση
Ευρωπαϊκό Κοινωνικό Ταμείο

Επιχειρησιακό Πρόγραμμα
Ανάπτυξη Ανθρώπινου Δυναμικού,
Εκπαίδευση και Διά Βίου Μάθηση
Ειδική Υπηρεσία Διαχείρισης
Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



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