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## Algae-Silica Hybrid Materials for Biosorption of Heavy Metals

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### ABSTRACT

Algae-silica hybrid materials for biosorption purposes were prepared using sol-gel technology. The resulting biological ceramics (biocers) ought to combine the mechanical stability and porosity of the silicate matrix with the algae's capability for the biosorption for heavy metals. The structure, mechanical properties, and sorption capability of such algae-silicate materials were investigated. Comparative equilibrium sorption experiments were performed batchwise with 13 different microalgae and macroalgae powders, and the corresponding algae biocers using waters loaded with either concentrations of nickel below 3mg/L or a mixture of different heavy metals (Cr, Ni, Cu, Pb). The algae biocers showed good mechanical stability up to an algae content of 30-50% and a total porosity of 40-60%. The silica matrix itself was involved in the sorption of metals. The metal binding capability of embedded macroalgae biomass was unaffected by immobilisation in the silica matrix. In contrast, for waters with nickel or different heavy metals, reduced sorption capability was shown by embedded microalgae.

### KEYWORDS

Biosorption, Algae, Sol-Gel Process, Immobilisation, Heavy Metals, Biological Ceramics

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