# Selenium Removal from Wastewater via Direct Electrochemical Reduction

The Mauter group has developed a method for removing selenium ions from wastewater using direct electrochemical reduction (DER). Selenium species are released into aquatic environments through anthropogenic activities such as mining, agriculture, and power generation. To comply with EPA discharge guidelines, biological and physiochemical treatment methods are currently used for selenium removal, but these are resource and cost intensive processes. This DER method utilizes specific reduction conditions to remove tetravalent selenium and selectively grows conductive crystalline selenium on the electrode, while tolerating a variety of incoming wastewater conditions. As a result, DER does not require a sacrificial electrode, which allows for continuous selenium removal with fewer parasitic reactions, lower energy consumption, and reduced solid production.



#### **Electrochemical Se(IV) Reduction in Aqueous Solutions**

#### **Stage of Research**

• Proof of Concept

## Applications

- Water purification
- Treatment for mine, agricultural, or power plant wastewater

#### **Advantages**

- Tolerates various incoming water qualities, unlike biological treatments
- Generates less residual waste than physiochemical and indirect electrochemical treatments

### Innovators

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