

Schwerpunkt Umweltbiotechnologie

Klassische Technologien und innovative Verfahren

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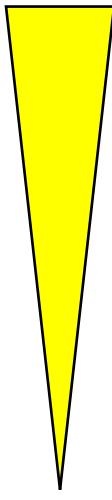
Courtesy Prof. Boronin, Pushchino

Multidisciplinary Education

Processes in soil – surface & sub-surface

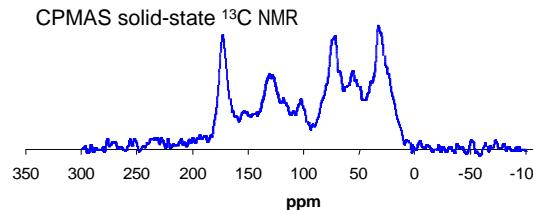
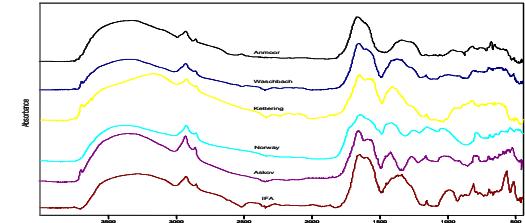
Microbiology - Engineering - Chemistry – Toxicology - Ecology

km



- **bioremediation**
- **biodegradation**
- **soil/pollutant interactions**

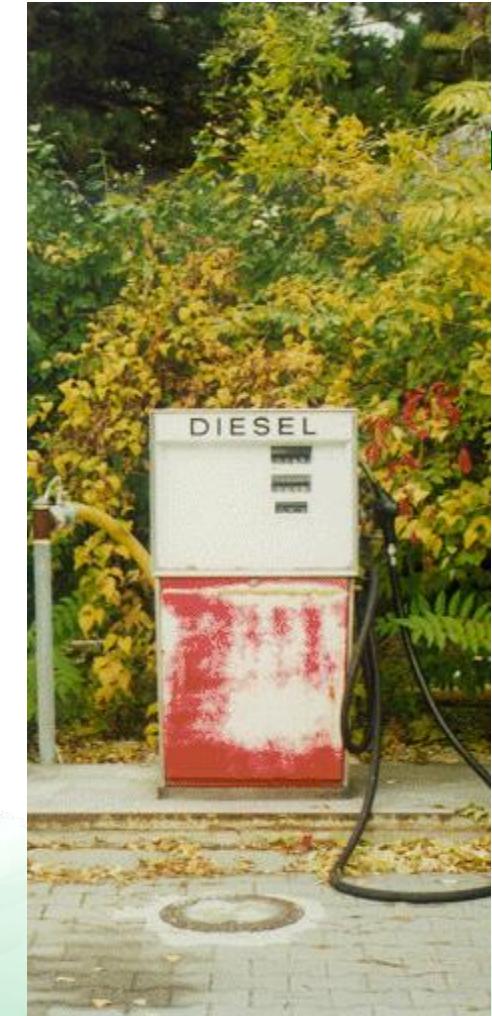
From fundamental research to implementation



Vorlesungen

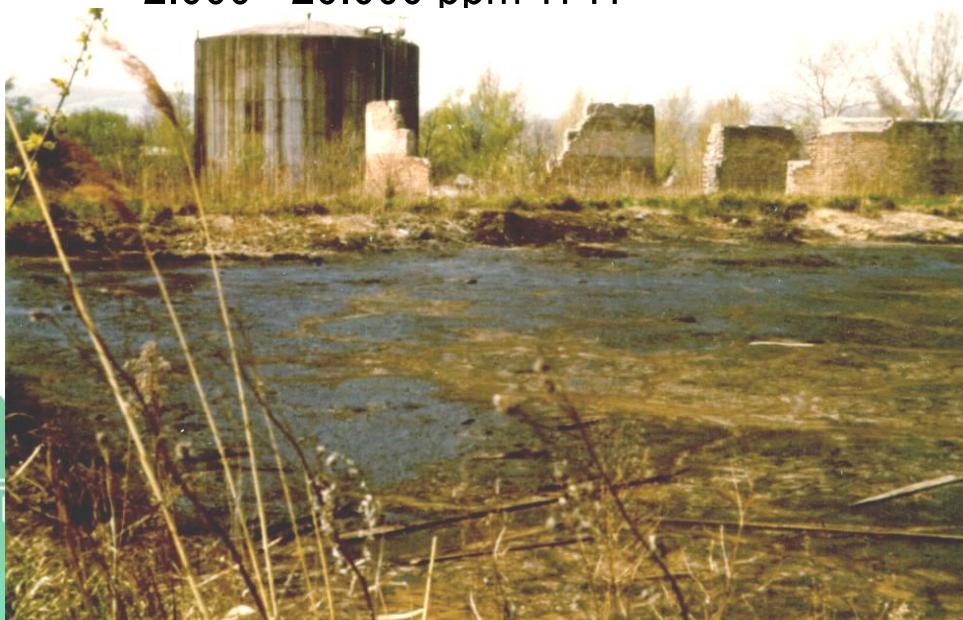
- Umweltbiotechnologische Verfahren, 791306, 3 SSt, VO, WS
 - Biogasproduktion und Anaerobtechnologie
 - Kompostierung, Mechanisch-Biologische Abfallbehandlung
 - Biologische Abwasserbehandlung
 - **Biologische Bodensanierung und Schadstoffverhalten im Untergrund**

- Umweltanalytik, 771303, 2SS, VO SS
 - Analytische Verfahren zum Nachweis und zur Bestimmung von Schadstoffen in Umweltkompartimenten **Boden**, Wasser und Luft sowie Biota



PHC Tuttendorf-Site

- former oil refinery site
- numerous incidents, crude and products
- large scale (180 000 m²)
- historic contamination (1923 - 1961)
- oil layer on groundwater
- 2.000 - 20.000 ppm TPH



Large Site Bioremediation



- funnel & gate installed; plus removal of 1000 tons PHC
- bioventing of vadose zone established
- nitrate as nutrient & electron acceptor in saturated zone



within 1,75 years about 200 tons of PHC *bioremoved*

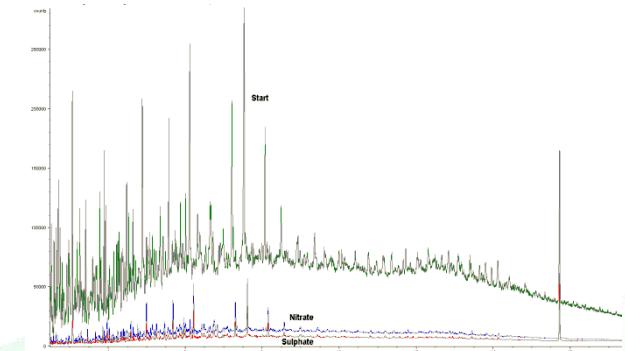


weitere Lehrveranstaltungen

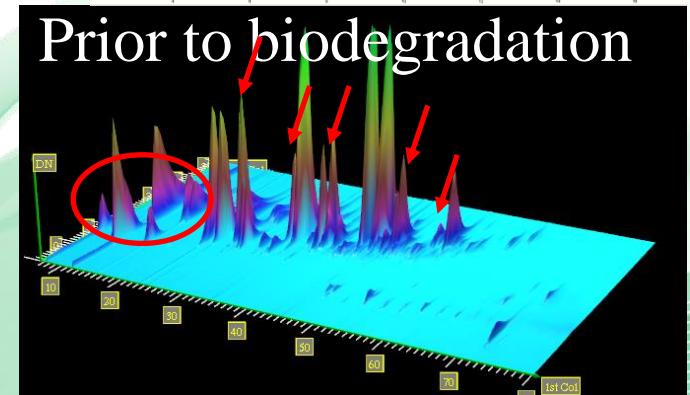
- Methods in Environmental Biotechnology (in Eng.),
970306, 3 SSt, UE, SS

Identifizierung & Quantifizierung von Schadstoffen

- Schadstoffextraktion aus Böden, Aufreinigung der Extrakte
- gaschromatographische Analyse & Auswertung der Chromatogramme
- Identifikation der Schadstoffe mittels Massenspektrometrie

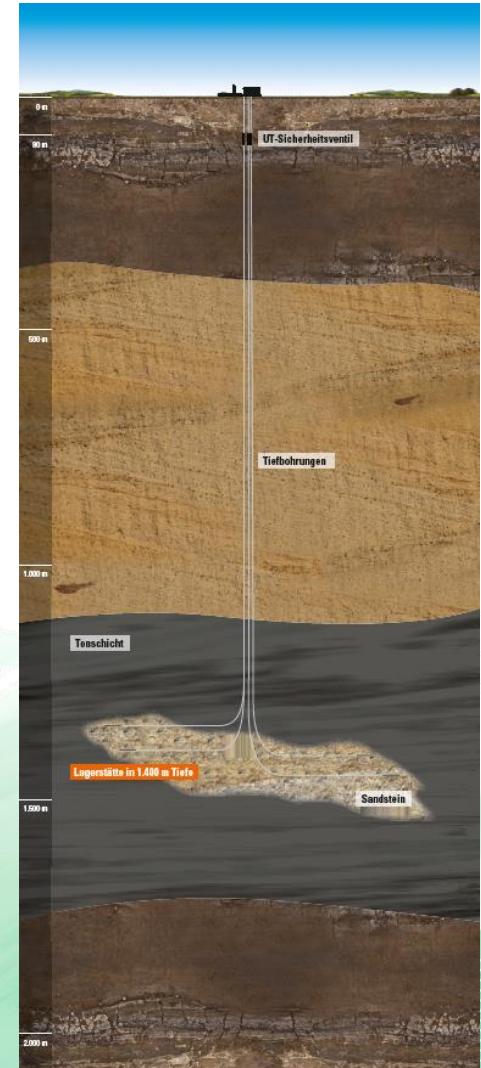


- Seminar in Environmental Biotechnology (in Eng.),
791374, 2SSt, SE, SS
- Ausgewählte Themen zur Umweltbiotechnologie,
spez. Geobiotechnologie & Umweltchemie
- Erarbeitung eines umweltbiotechnologischen Themas,
Präsentation & Diskussion



Power to Gas Strategy

- electricity from renewable resources
- conversion of electricity to chemical energy (H_2)
- use natural gas storages
- distribution via existing grid



H₂ Storage in Natural Gas Reservoirs



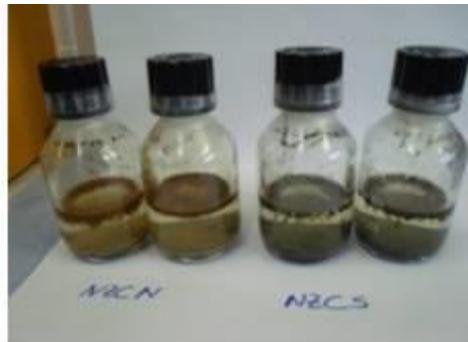
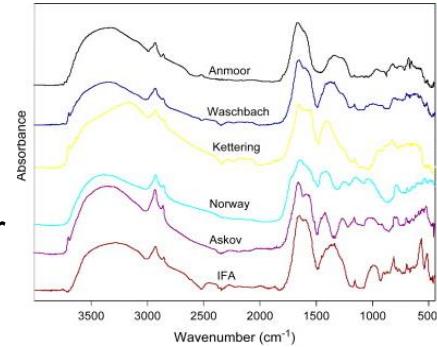
Microbial H₂ consumption?

Testbed

- Gas volume 2.000.000 m³ / 10% H₂
- @ 70b & 40°C

Bakkalaureats- und Masterarbeiten

- werden laufend vergeben:
 - Schadstoffinteraktion mit Böden (*bioaccessibility studies*)
 - Mikrobieller Abbau von Schadstoffen und Pestiziden in Boden und Grundwasser
 - *involved microbial consortia*
 - *desorption of non accessible pollutants*
 - *degradative mechanisms of exoenzymes*
 - *isotope fractionation*
- Speicherung von Wasserstoff in Untertagespeichern
 - *hydrogen consuming processes*



Contact

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Thank you for your attention



