

GES175, Science of Soils



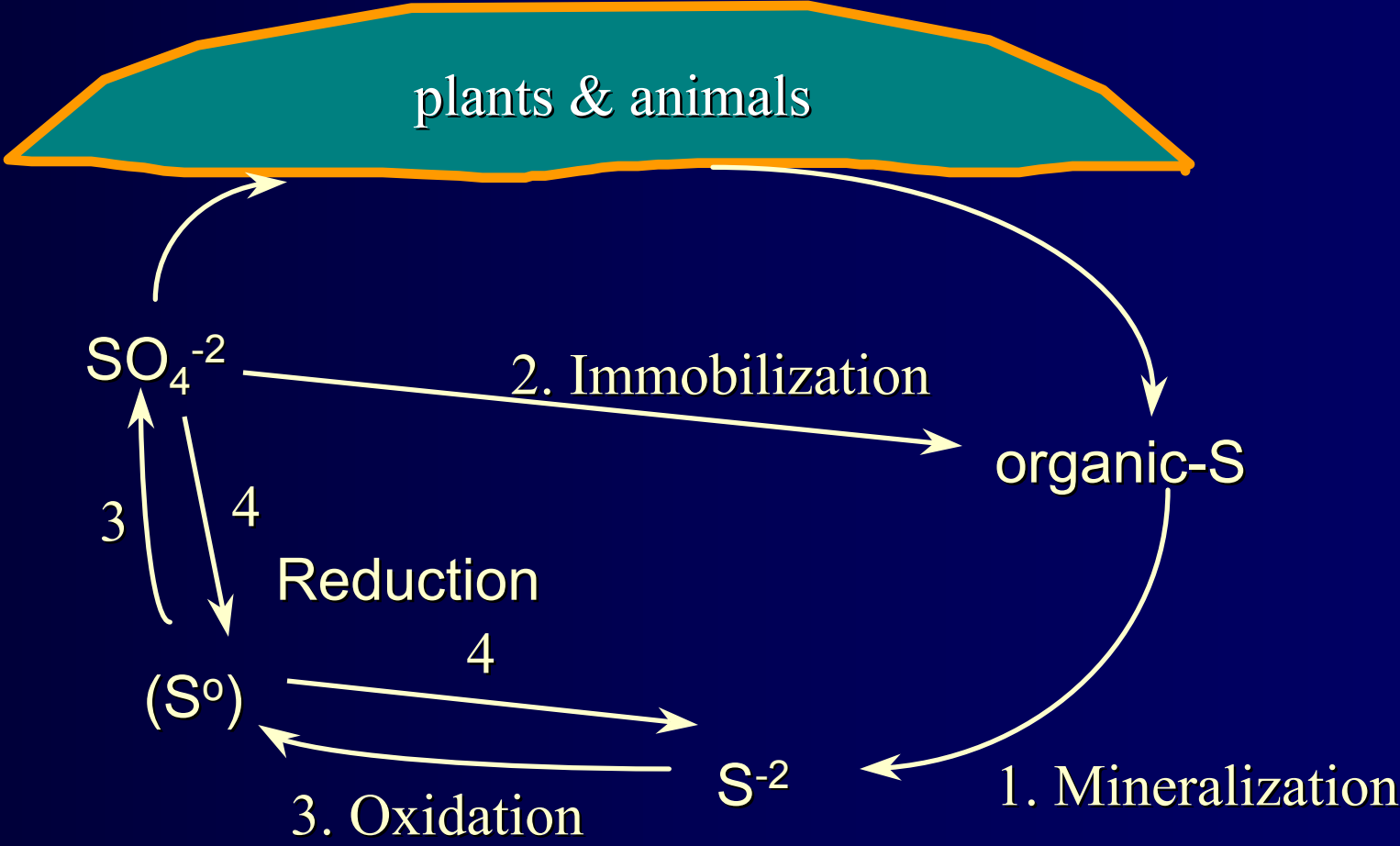
Lecture 9

**SULFUR**

# Relevance of Soil Sulfur

- \* Used in amino acids, vitamins
- \* Plant Deficiency
  - ◆ small and spindly plants
  - ◆ yellowish leaves (new tissue)
- \* Environmental Problems:
  - ◆ acidification
    - acid rain
    - sulfide oxidation

# Sulfur Cycle





S oxidation and reduction?

# Acid Mine Drainage

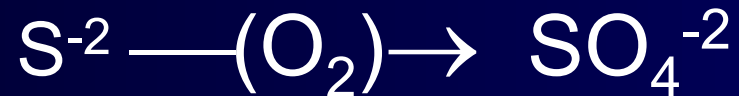


## Result of Acid Mine Drainage



# S oxidation and Reduction

- \* Oxidation



- \* Autotrophic microorganisms:

*Thiobacillus*

- ◆ energy obtained from S oxidation

- \* Acid producing process



# Reduction



- \* Anaerobic process
  - ◆ organisms use S in place of O<sub>2</sub> as a terminal e<sup>-</sup> acceptor
  - ◆ “sulfate reducing bacteria” (obligate anaerobes)

## Reduction (cont'd)

- \*  $S^{-2}$  can be toxic

- ◆ forms  $H_2S$  gas

- ◆ reacts with Pb, Cd, Zn  $\Rightarrow$

insoluble  
compounds

- \* mostly, heterotrophic organisms

- ◆ require OM for energy source