

REVIEW FOR LECTURE EXAM 4 FINAL

Tuesday, December 11, 1:00 - 3:00pm

Mineral Deposits

Nonmetallic Mineral Deposits

- Chemical-Li, K,& P-minerals, NaCl, S
- Fertilizers-P&K-minerals, CaSO₄, Ni, S
- Abrasives
- Gem minerals
- Pigments
- Construction
- Ceramics
- Asbestos

Metallic Mineral Deposits-Al, Au, Ag, Cu, Fe, Ni, Pb, Zn, Mn, Mg

- Ore deposits: gangue
- Ore determining factors: economy, technology, and politics

Geologic Processes and Mineral Deposits

Igneous Related Mineral Deposits

- Mineral fractionation/gravity settling
- Hydrothermal activity (Ex: Silver City Mining District)
- Contact metamorphism

Sedimentary Related Mineral Deposits

- Chemical precipitates(Ex: Banded Iron Fm., Lake Superior Region)
- Placer deposits (Ex: Witswatersrand Fm., Africa)
- Weathering (Ex: Bauxite from lateritic soils)

Fossil Fuels

Coal

- Depositional environment-abundant organics (plants), reducing conditions, no wave action

- Formation of coal from peat -compaction and heating

- Coal rank: % of carbon

- Lignite=70-80% carbon
- Bituminous =80 -90% carbon
- Anthracite=90-100% carbon

Hydrocarbons - Oil and Natural Gas

- Conditions needed to get hydrocarbon accumulation:

- Source - reducing conditions, quiet water, abundant organics (algae, bacteria, microfauna) typically black shales

- Maturation - maturation window (60°C - 250°C)

- Migration - highly porous and permeable rocks (e.g. sandstone) or faults

- Seal - low porosity and permeability rocks (shales and evaporites) or faults

- Reservoir - thick, high porosity and permeability rocks (sandstones and conglomerates)

- Trap - structural and stratigraphic

Groundwater

Definition

- Water Types: fresh, brackish, saline, brine

- Origin-recharge/discharge areas

- Depth of Groundwater: unsaturated zone, saturated zone, water table

- Groundwater Movement: percolation

Groundwater Reservoirs

- Springs, wells,
- Aquifers (unconfined, confined, Artesian)