

Seminar 1

- Basic dental materials
 - Gypsum – properties and mixing
- Carving: the upper incisor of the gypsum block
 - Teeth identification

Basic dental materials

- Main

Preventive materials

Resine composite restorative materials

Amalgam

Cements

Noble dental alloys

Cast base-metal alloys

Ceramics (ceramic-metal systems)

Polymers for prosthesis

Basic dental materials

- Auxiliary

Gypsum

Waxes

Impression materials

Grinding and Polishing Materials

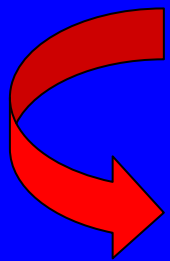
Gypsum

- Main source: gypsum rock
- Dihydrate of calcium sulfate
 $(\text{CaSO}_4) \cdot 2 \text{H}_2\text{O}$

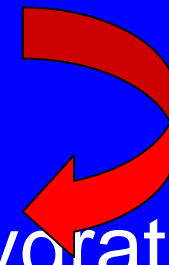
Gypsum

- Dihydrate of calcium sulfate
(CaSO₄) · 2 H₂O

Heating

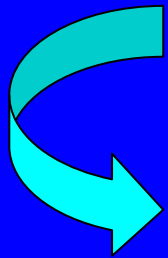


- Calcium sulfate hemihydrate
(CaSO₄) · H₂O

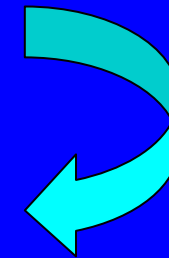


Gypsum

- Calcium sulfate hemihydrate
(CaSO₄) · H₂O



Water



- Calcium sulfate dihydrate
(CaSO₄) · 2 H₂O

Gypsum

- Exothermic reaction :
- 1,5 g mol water1 g mol of calcium sulfate dihydrate 3900 calories of heat

Gypsum

- Die material – model
- Impression material
- Binder material in casting investment

Gypsum

Three types of base raw materials derived from partial dehydration of gypsum rock

- Plaster (Fluffy, soft)
- Hydrocal (higher density, more crystalline)
- Densite (the densist material)

Gypsum

- Plaster (Fluffy, soft)
- Hydrocal (higher density, more crystalline)
- Densite (the densist material)

The same chemical bases, different physical properties

Gypsum

➤ Plaster (Fluffy, soft)

Gypsum mineral heated in an open kettle at a temperature 110°C – 120°C

β– calcium sulfate hemihydrate

Lab plasters, formulating models

Gypsum

➤ Hydrocal (higher density, more crystalline)

Gypsum mineral dehydrated under pressure and in presence of water vapour at 125°C

α – calcium sulfate hemihydrate

Low-moderate dental stones

Gypsum

➤ Densite (the densist material)

Gypsum rock is boiled in a 30% calcium chloride solution after that the chloride is washed with hot water and the material is ground – powder.

Gypsum

Modifying chemicals

(handling characteristic, properties)

Potassium sulfate (K_2SO_4), terra alba: accelerators

Sodium chloride – shortens setting reaction,
increases expansion

Sodium citrate – retarder

Borax both retarder and accelerator

Calcium oxide, gum arabic- reduces the amount of water
necessary to mix gypsum products.

Gypsum

Water/powder ratio

100g of powder:

Model plaster 37 - 50

Dental stone 28 - 32

High strength dental stone 19 – 24

Expansion during setting

Spatulation

Gypsum

- Water
- Powder until it sucks (draws) water
- Spatulate – paste, mash
- Put into the form – check setting

