39th IACDE National Conference

Zeolites unleashed... Pioneering Advances in Dentistry

History

Discovered by **Axel Fredrik Kronstaedt in 1756.**
Used in Dentistry in **1980**

Zeolites are naturally formed during a volcanic eruption over thousands of years.

When Lava contacts the sea, it undergoes a series of reactions with salt and water to produce crystalline structures called zeolites.

The word zeolite comes from two Greek words "zeo" = coke and "lithos" = stone, meaning boiling stone.

Naturally Found in *China, Korea , Indonesia & USA*

Forms

1. **Zinc Zeolites**
2. **Calcium Zeolites**
3. **Silver Zeolites**
4. **Strontium Zeolites**

Chemical formula

$(MAlO_2)(SiO_2)_x(H_2O)_y$

Mechanism of action

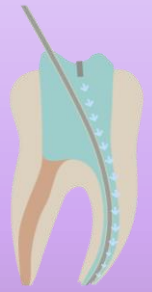
- Zn zeolites releases reactive oxygen species
- Ca2+ zeolites have a molecular sieve shape that releases calcium ions and rebuilds the hydroxyapatite structure.
- ZIF-8 inhibits hydrolytic degeneration and, improves wettability

Used in

- **Cancer detection**
- **Industries**
- **Agriculture**
- **Agro**
- **Pharmaceuticals**

In Dentistry

- **Dental adhesive**
- **Temporary filling material**
- **Resin-based restorative material**
- **Crown for anterior teeth**
- **Root end filling, irrigants**



Properties

- Antimicrobial
- Improve shear strength
- Improve corrosion resistance
- Enhances esthetics

Functions

- Prevents secondary caries
- Promotes remineralization
- Prevents secondary infection in root canals
- Improve optical properties
- Prevents veneer chipping off

Conclusion

Zeolites have ion exchange capacity and biocompatibility making them a promising material in dentistry. Hence zeolites can be a game changer in the future of restorative dentistry and endodontics.