

GT. H. RAISONI COLLEGE OF ENGINEERING AND  
MANAGEMENT, WAGHOLI PUNE  
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Department	F.Y. B.TECH
Term / Section	II   Date of Examination - 22/06/2021
Subject Name	ENVIRONMENTAL CHEMISTRY (UBSL102).
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C01 a) Causes of Boiler Corrosion are as follows:

- 1) Improper and unscheduled maintenance.
- 2) Exposure of boiler metal to dissolved gases present in boiler water.
- 3) Oxygen present in boiler.
- 4) Carbon dioxide present in boiler water.
- 5) Unbalanced pH of boiler water.
- 6) High temperatures and stresses in the boiler metal tend to accelerate the corrosive mechanisms.
- 7) Metal exposed

## CO1 c.) Cold Lime-Soda Process

## Hot Lime-Soda Process

1. It is done at room temperature (25-30°C).

It is done at elevated temperature (94-100°C).

2. It is slow process.

It is rapid process.

3. Use of coagulants is must.

Coagulants are not needed.

4. Filtration is not easy.

Filtration is easy as the viscosity of water becomes low at elevated temperatures.

5. Softened water has residual hardness around 60 ppm.

Softened water has residual hardness of 15-30 ppm.

6. Dissolved gases are not removed.

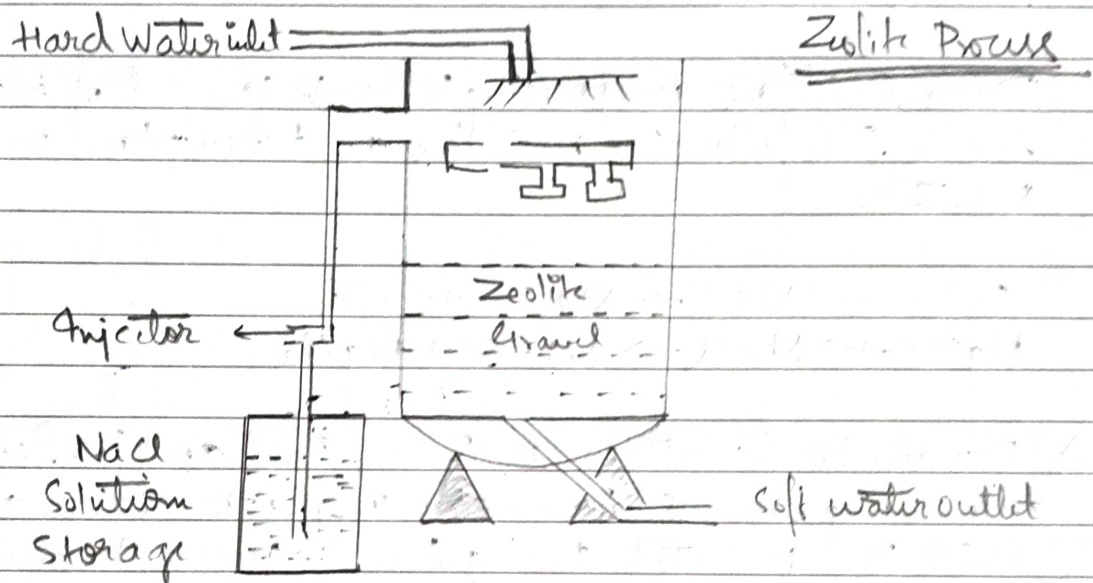
Dissolved gases like  $\text{CO}_2$  are removed to some extent.

7. Low softening capacity.

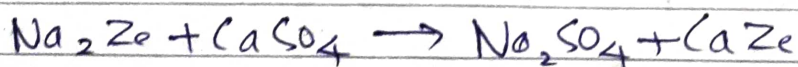
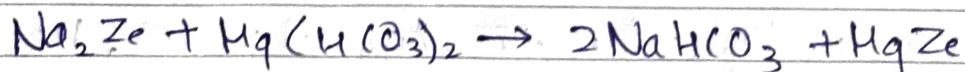
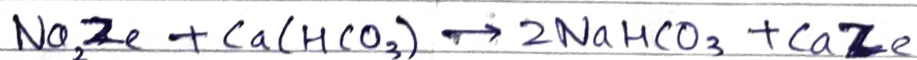
High softening capacity.

CO1 d.) Zeolite is micro-porous mineral which is used as catalyst in many industrial purposes such as water purification and air purification.

## Zeolite Process for Water Softening:



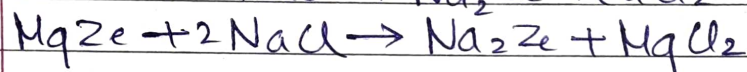
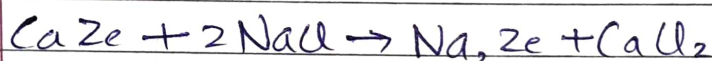
Zeolite process of water softening has become a commercial success for the reason that zeolite can be easily regenerated. When  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions containing hard water is passed through a bed of sodium zeolite, the sodium ions are replaced by the calcium and magnesium ions.





When all sodium ions are replaced by calcium and magnesium ions, the zeolite becomes inactive. Then the zeolite needs to be regenerated.

Brine solutions are passing through the bed of inactivated zeolite. The following reactions are taken place and form  $\text{Na}_2\text{Ze}$ .



CO2 b.) Bio-medical waste means "any solid and/or liquid waste including its container and any intermediate product which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps.

Biomedical waste poses hazard due to two principal reasons - the first is infectivity and other toxicity.

• Biomedical waste consist of :-

1. Human anatomical waste, Animal wastes, Microbiology and biotechnology wastes
2. Discarded medicines and drugs.
3. Solid waste such as dressing bandages, plaster casts, materials contaminated with blood.

Segregation refers to basic separation of different categories of waste generated at source and thereby reducing the risk as well as cost of handling and disposal.

Proper labelling of bins

Proper storage for waste

Transportation

Personal Safety measures such as masks, gloves, boots, Broom, Dustpan, Mop, Vacuum cleaner.

Chutes are also necessary to avoid horizontal transport of waste thereby minimizing the routing of the waste within the premises and hence reducing the risk of secondary contamination.