

NMR Pipetector[®]

**Only one Anti-Corrosion Device
for water pipe work in the world!**



2013.08.09



Japan System Planning Co., Ltd.

NMR PIPETECTOR®

**Only Electrolytic Anti-Corrosion Device
by Free (Hydrated) Electrons of Water.**

**EU Patented New Technology
NMR Method
It is not Magnetic or Ceramic Device.**



- ◆ Article of NMR Technology has been presented and accepted by 13th Asian-Pacific Corrosion Control Conference in 2003.
- ◆ More than 3,300 successful installations with scientific data in worldwide including Royal Buckingham Palace, Royal Windsor Castle, Royal Westminster Palace, BBC, famous Hotels and Hospitals in United Kingdom.
- ◆ Provides anti-corrosion effect evidence with scientific data in short period.

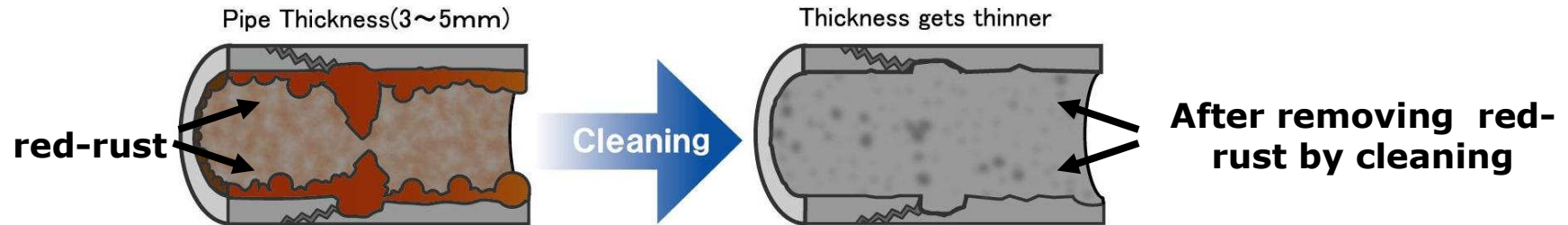
Advantage Points of NMR Pipetector

- 1. Prolong life of water pipe more than 70 years by changing corrosion to magnetite.**
- 2. Total cost is less than 1/10th of replacement of water pipe.**
- 3. No need to cut off water pipe for installation.**
It is very important feature for Hotels and Hospitals.
- 4. Completely stops internal corrosion of water pipe by Hydrated Electron generated from water molecules.**

NMR effect can keep small water cluster with external hydrated electron for more than 6 hours, and pressure pump makes this water move and hydrated electrons are generated to change corrosion to magnetite.

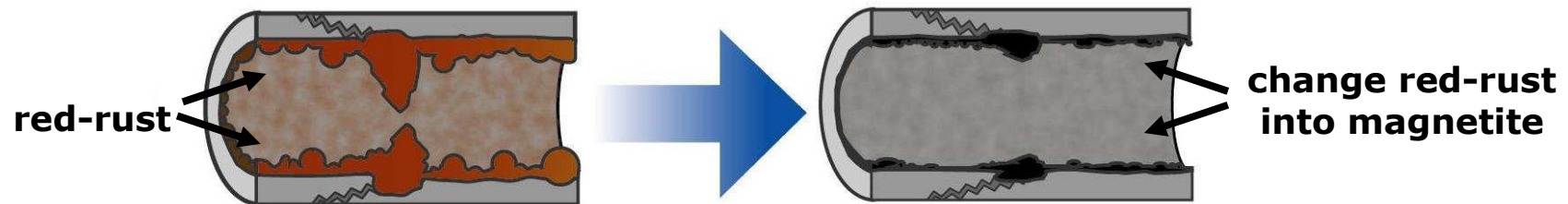
Problem of Removing Internal Corrosion (Red-Rust)

● Typical Cleaning Work



- Removing red-rust makes thickness of pipe work thinner.
- Removing red-rust makes new corrosion more quickly.
- And it makes life time of water pipe work shorter.

● NMR Pipetector



- NMR Pipetector changes existing red-rust into magnetite.
- Magnetite protects inside of water pipe and prolongs life of water pipe for more than 70 years.
- Magnetite decreases blockage, cubic size is $1/10^{\text{th}}$ of red-rust.

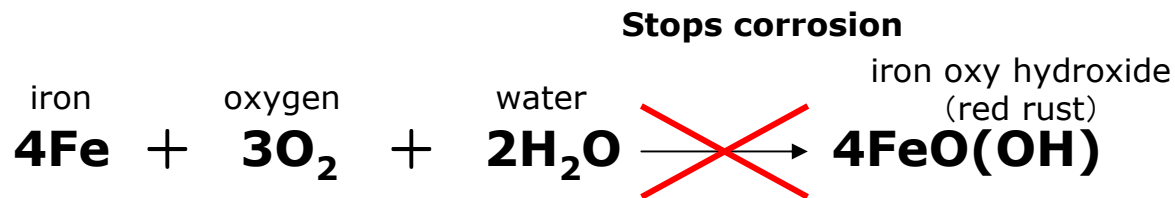
■ Existing red-rust must not be taken out.

■ Perfect solution is to change existing red-rust into magnetite.

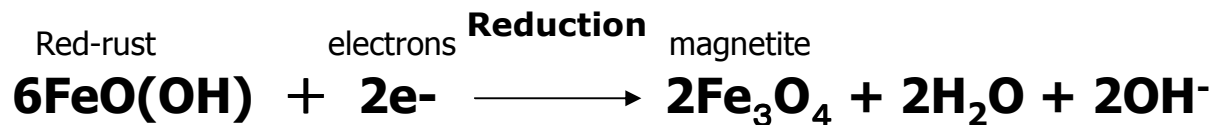
Electrolytic Anti-Corrosion Method

● How to prevent internal corrosion of the water pipe work

- ◆ Corrosion begins when iron of the pipe work discharges its electrons and red-rust is developed when iron is reacted with oxygen and water molecules.
- ◆ In reverse, red-rust can be stopped if electrons are supplied to this iron.



- ◆ Continuous supply of electrons changes existing internal red-rust into magnetite (black-rust).



- ◆ Supplying electrons is the only way to stop corrosion.

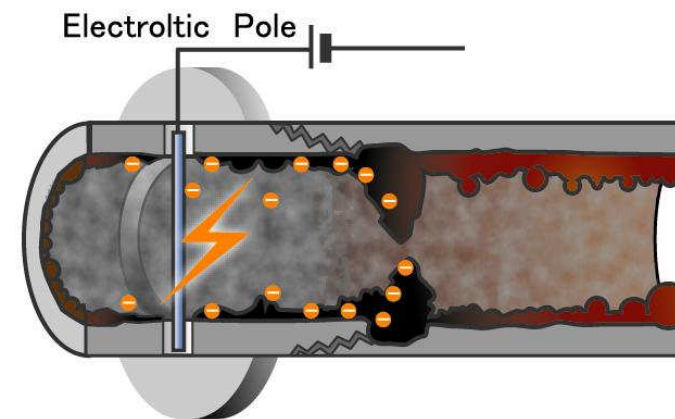
- The electrolytic protection is the only way to prevent corrosion.
- Anti-corrosion chemical slows down progress of corrosion, but it cannot stop it completely.

Traditional Electrolytic Pole System and Problem

- **Traditional electrolytic pole method cannot be realized due to the cost of system is higher than replacing whole water pipe work.**

- ◆ It is the method that electrolytic pole connected to external electric power is installed to the water pipe and discharge electrons from the pole.
- ◆ However, electrons discharged from the pole can reach only short distance (within range of 1.5 times of pipe diameter). Therefore electrons are not available for further area and no protection effect is expected.
- ◆ In order to apply protection effect through out the water pipe work, many thousands of electrolytic poles need to be installed. This causes,

- **Cost of electrolytic pole installation is more than replacing pipe work.**
- **Strength of the water pipe become weak and causes problem on safety.**



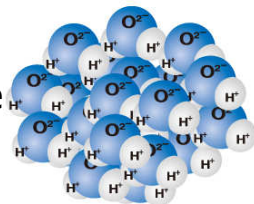
Electrolytic Protection Done By Hydrated Electron

● Use of hydrated electron of water is the only possible way to stop corrosion inside water pipe.

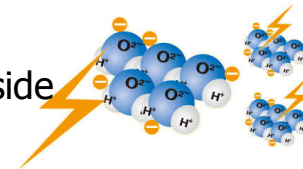
- ◆ There are free electrons (hydrate electron) in water. But normally free electrons are blocked inside of large cluster of water molecules and they are not generated even there are water movement in the water pipe.
- ◆ However, free electrons of water comes outside of the water cluster if large cluster of water molecules change to small cluster. (*1)

*1 : Stated in Articles on Science Vol.307 "Observation of Large Water Cluster Anion with Surface-Bound Excess Electrons"

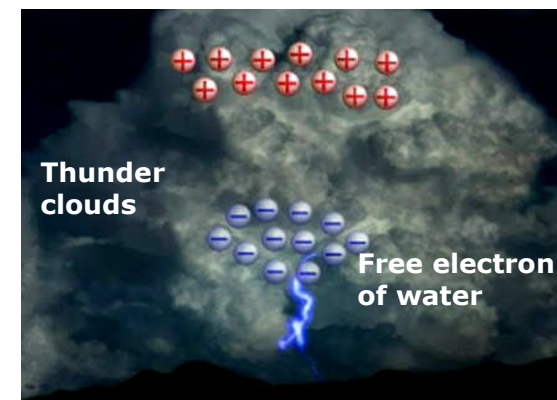
Large Cluster of Water
Free electrons are inside



Small Cluster of Water
Free electrons are outside

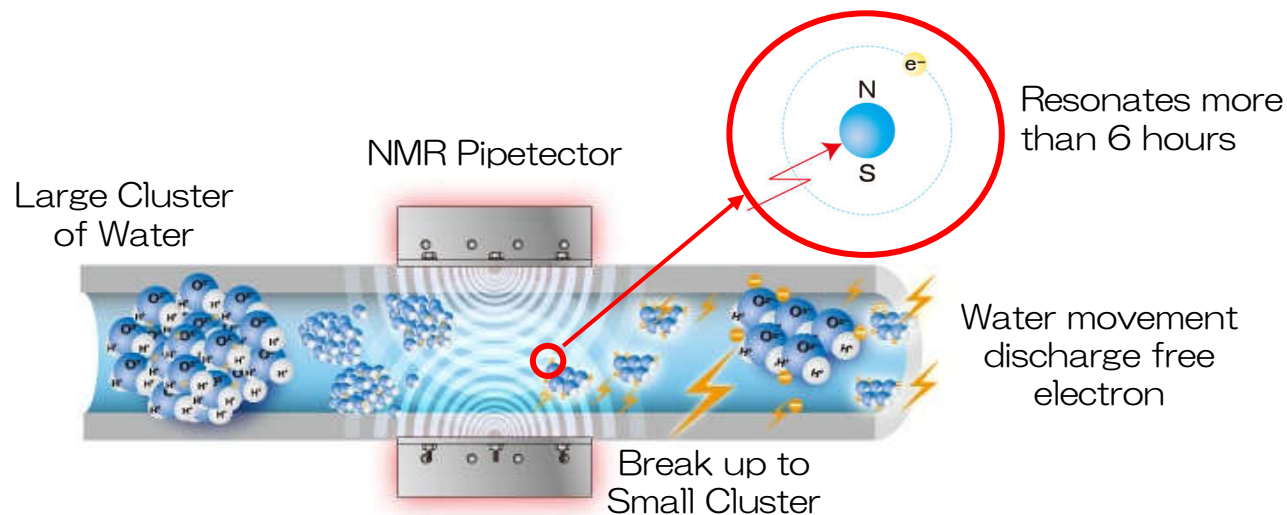


- ◆ When water with this condition get move then free electrons of water are generated.
- ◆ It is same phenomenon with electrons generated in thunder clouds where small cluster of water is rapidly moving



NMR Effect Makes Water Cluster Small for More Than 6h

- **NMR Pipetector changes large cluster of water to small cluster by effect of resonance. And keeps its condition for more than 6h.**
- ◆ The hydrogen nucleus of water molecule is resonated when it receives specific electromagnetic wave. And large water cluster changes to small cluster.
- ◆ NMR Pipetector generates specific length of electromagnetic wave and causes NMR effect to make large cluster of water to small cluster.
- ◆ And this condition continues for more than 6 hours. Therefore hydrated electrons are generated through out the water pipe when water is moving.
 - NMR Pipetector is the only device that can stop corrosion in water pipe.



Blackbody Radiation

● 『NMR Pipetector』 generates electromagnetic wave based on blackbody radiation theory.

◆ Black-body radiation theory is the material object generates electromagnetic wave, not having any influence from the outside. Ceramic or charcoal is one of the examples.

◆ Ceramics are sintered by 1200°C when the process of manufacture can store thermal energy in the ceramic. Then ceramic can radiate multiple wavelengths of far-infrared waves created by this process.

◆ Charcoal is carbonized at more than 800°C , therefore charcoal can also generate multiple wavelengths of infrared waves.



【Charcoal】

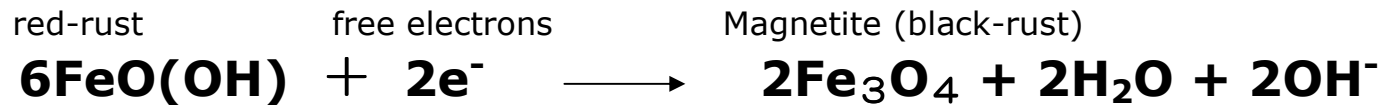
◆ Based on this theory, NMR Pipetector incorporates wave generating material with wavelength balancing materials of 12 different rare earth metals inside it and the device is designed to generate a specific electromagnetic wave which is ideal for the NMR effect without external power source.

Anti-Corrosion Effects of NMR Method

- ◆ Continuous generation of hydrated electron of water will
 - Completely stops internal corrosion of the water pipe work.

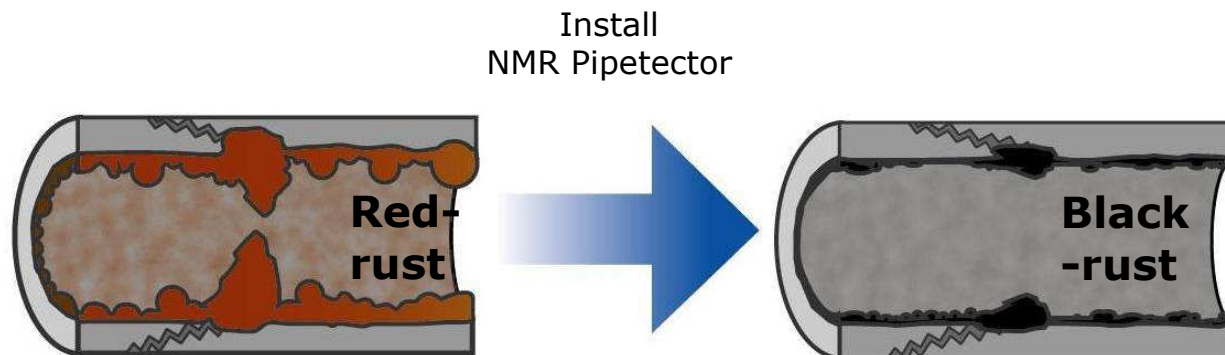


- Change existing red-rust into magnetite (black-rust)



◆ Magnetite (Black-Rust)

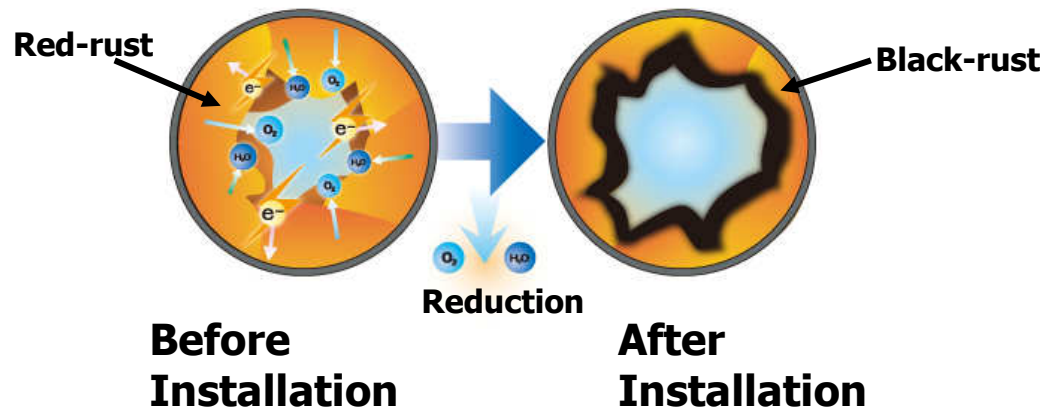
- Magnetite gets no oxidation, is robust and does not dissolve into water.
→ Provide protective barrier to inner wall and extends life more than 70 years.



Effects of NMR Method

◆ Decrease Blockage of Pipe

It decreases blockage of pipe work because cubic size of magnetite is 1/10th of red-rust.



◆ Resolve Red-colored Water Problem

Red-colored water becomes clean water because NMR Pipetector stops causing new red-rust, changes red-rust layer to magnetite, and red-rust solved in water is changed fine particle of magnetite and absorbed to magnetite layer of inside pipes.

