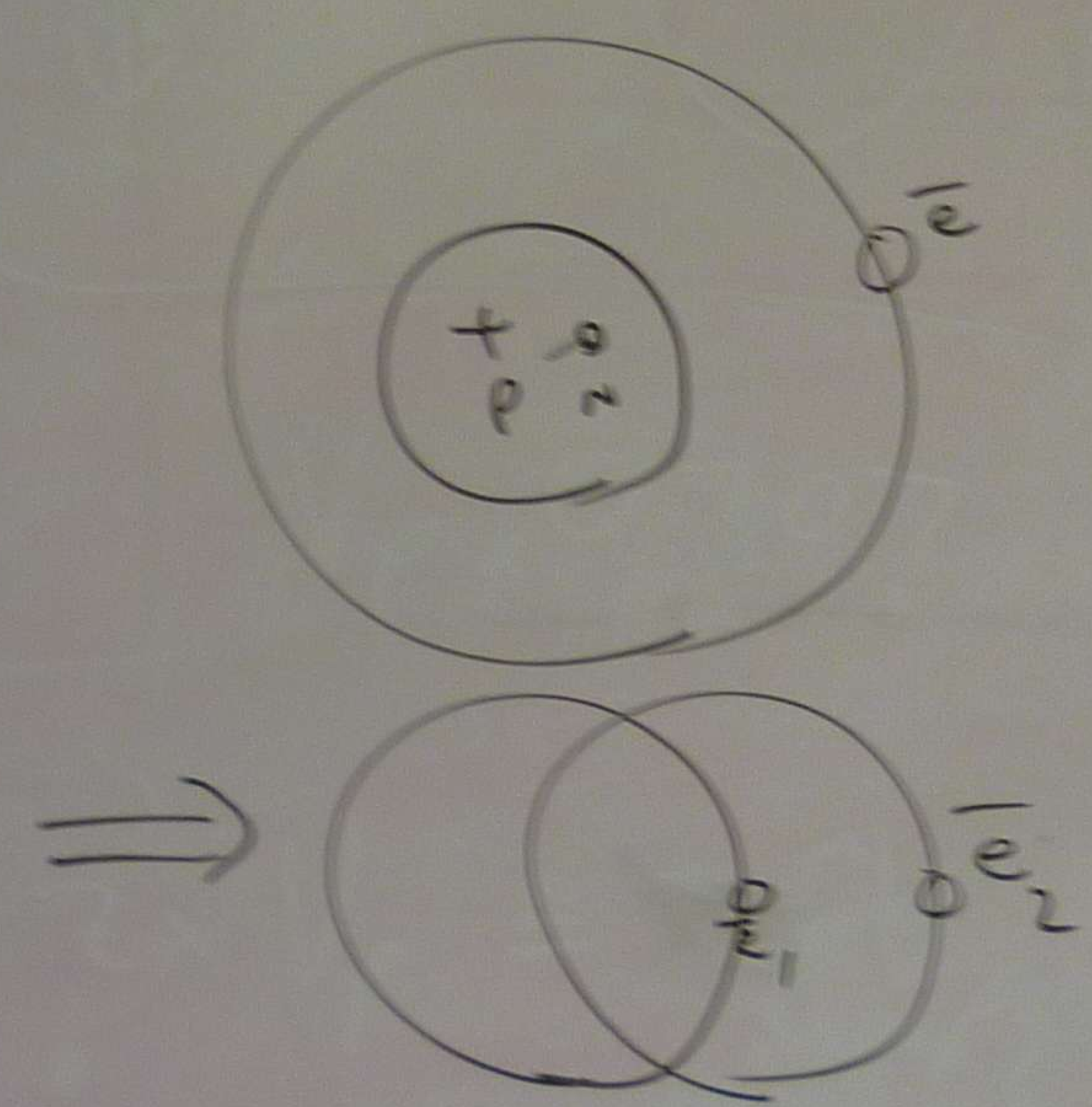
Q22 SKETCH

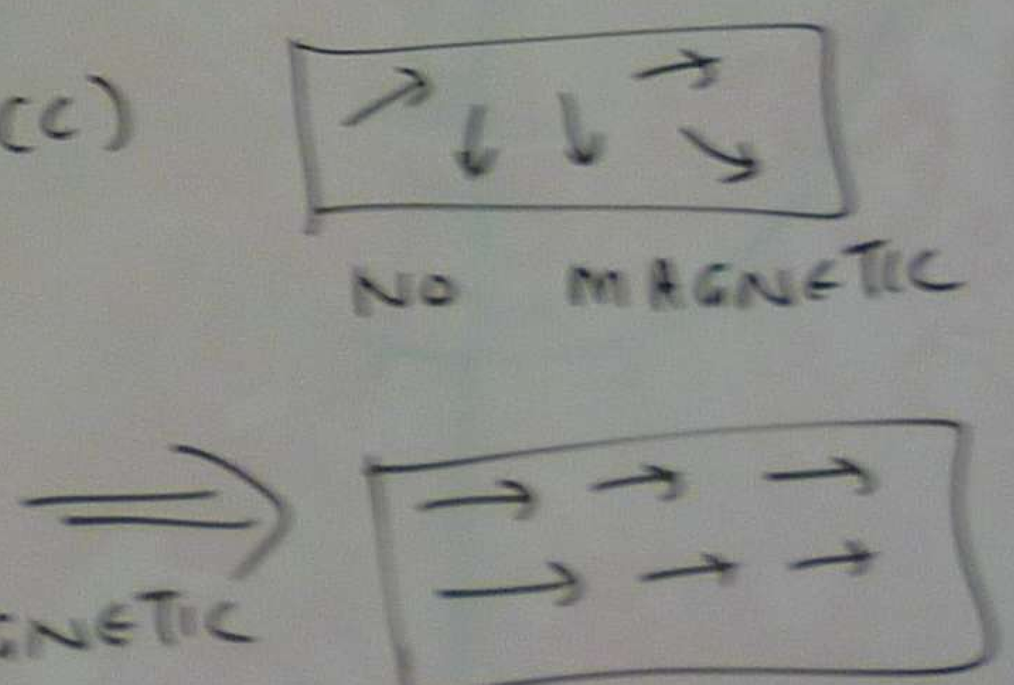
(a) ELECTRONIC POLARIZATION (b) IONIC POLARIZATION (c) ORIENTAL POLARIZATION

(a)



(b)

(c)



NO MAGNETIC EFFECT

MAGNETIC FIELD

ORIENTAL POLARIZATION

Q29 DESCR

Q30 DESCR

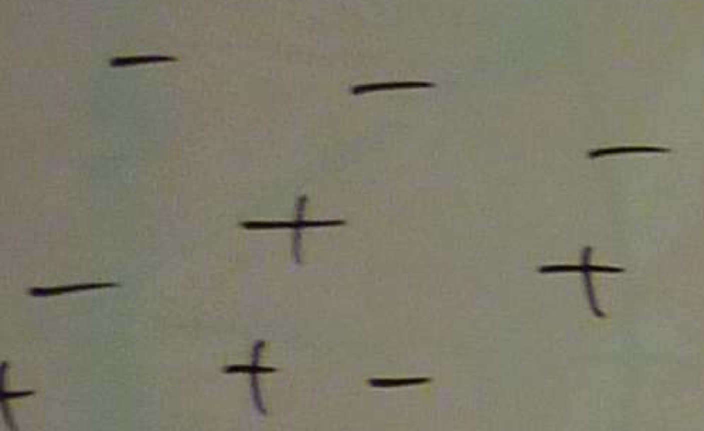
Q31 DESC

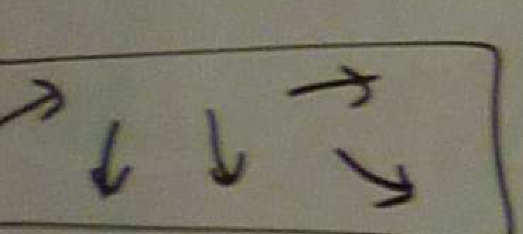
Q29 DUE
OF EL

Q30
ATO

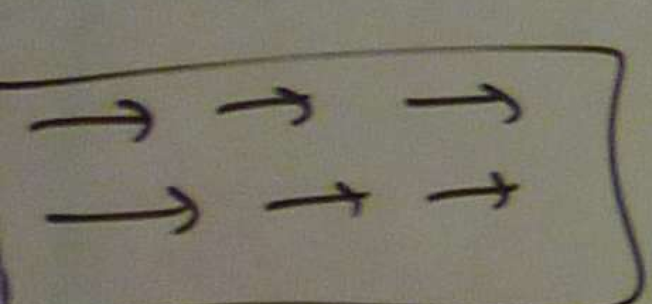
Q31

(c) ORIENTAL POLARIZATION





NO MAGNETIC EFFECT



ORIENTAL POLARIZATION

Q29 DESCRIBE ELECTRONIC POLARIZATION

Q30 DESCRIBE IONIC POLARIZATION

Q31 DESCRIBE ORIENTAL POLARIZATION

Q29 DUE TO ELECTRIC FIELD, THE ORBIT OF ELECTRON SHIFTS TO NEW ORBIT

Q30 DUE TO ELECTRON MOVING OUT FROM ATOM, + HOLES AND − ELECTRONS APPEAR IN ATOM

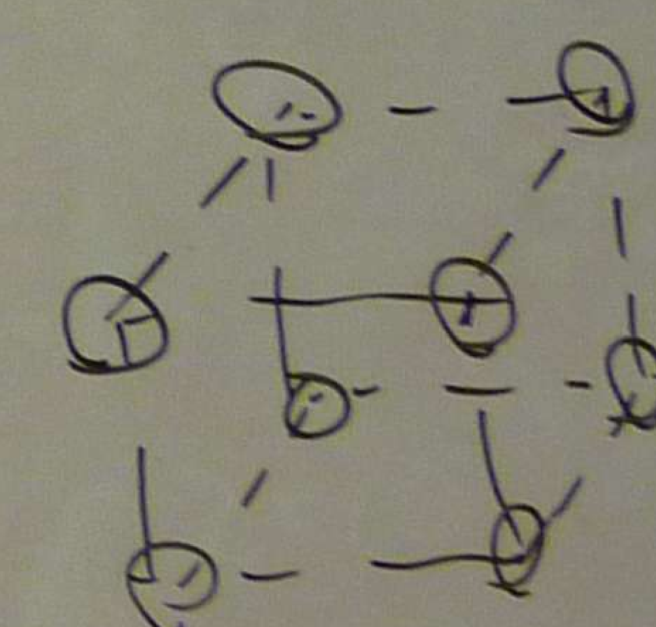
Q31 DUE TO MAGNETIC FIELD, THE MAGNETIC PARTICLES IN DIFFERENT DIRECTIONS ALIGN TO PARTICULAR DIRECTION AND THE MATERIAL POSSESSES THE MAGNETISM.

Q24 EXPLAIN ORGANIC

ORGANIC COMPOUNDS
BASIC AND CAN BE
ORGANIC COMPOUNDS
DIELECTRIC MATERIALS.

Q25 SKETCH THE
(a) SIMPLE CUBIC
LATTICE (c)
(b)

(a)



...LARIZATION

...IZATION

POLARIZATION

...D, THE ORBIT

NEW ORBIT

...MOVING OUT FROM

— ELECTRONS

...M

...TIC FIELD, THE

...CLES IN DIFFERENT

...GN TO PARTICULAR

THE MATERIAL

...MAGNETISM.

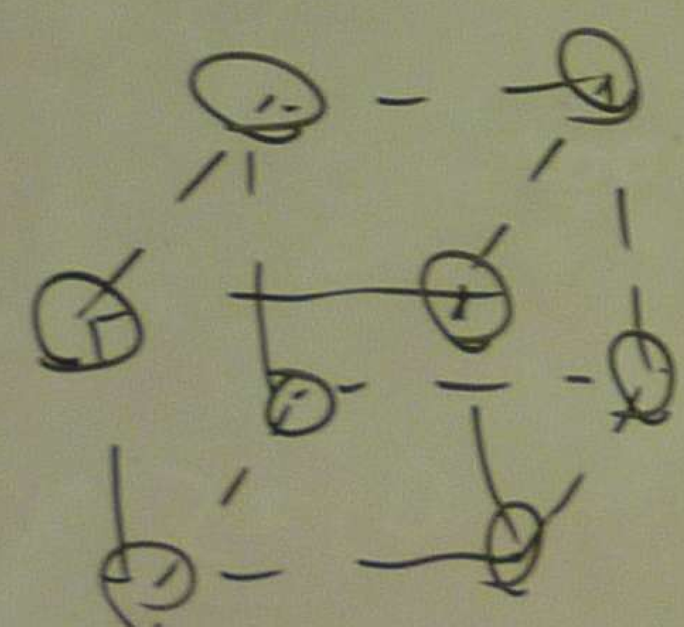
Q24 EXPLAIN ORGANIC COMPOUNDS.

ORGANIC COMPOUNDS CONSIST OF CARBON AND HYDROGEN AS BASIC AND CAN BE COMPOUNDED WITH FLUORINE E.T.C. ORGANIC COMPOUNDS ARE APPLIED TO MAKE INSULATION AND DIELECTRIC MATERIALS.

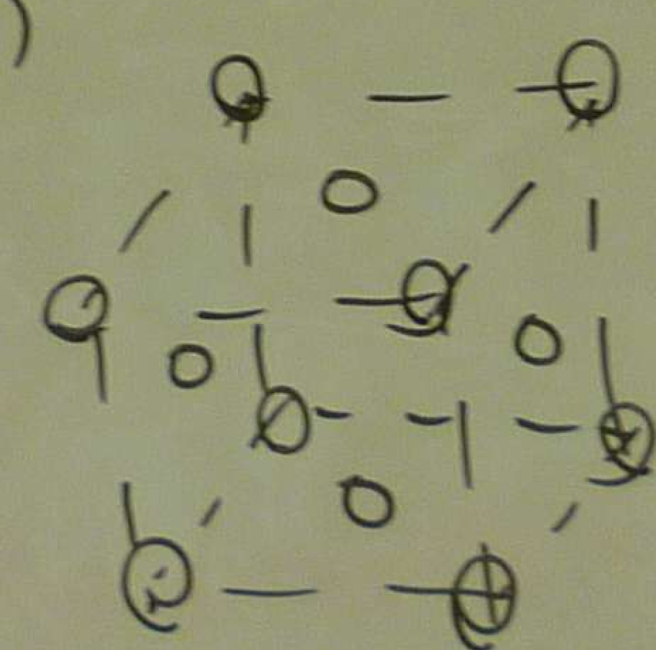
Q25 SKETCH THE FOLLOWINGS

(a) SIMPLE CUBIC LATTICE (b) FACE CENTRED CUBIC LATTICE (c) BODY CENTRED LATTICE.

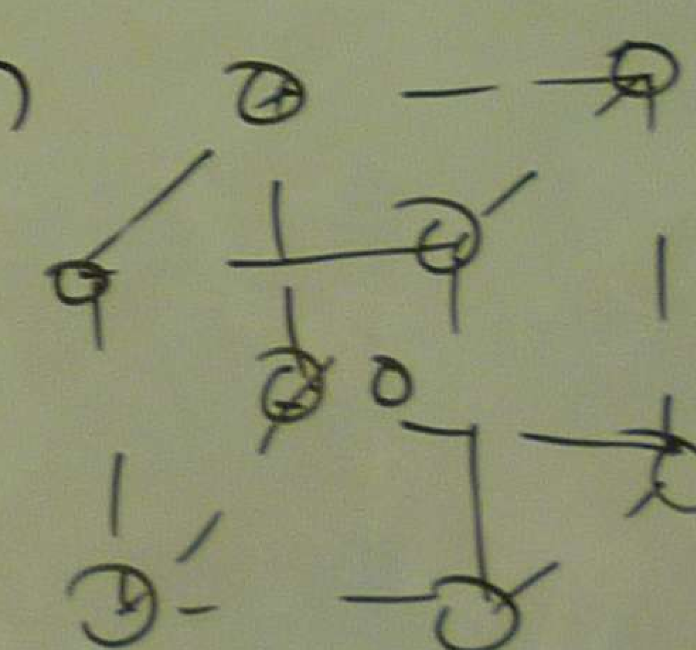
(a)



(b)



(c)

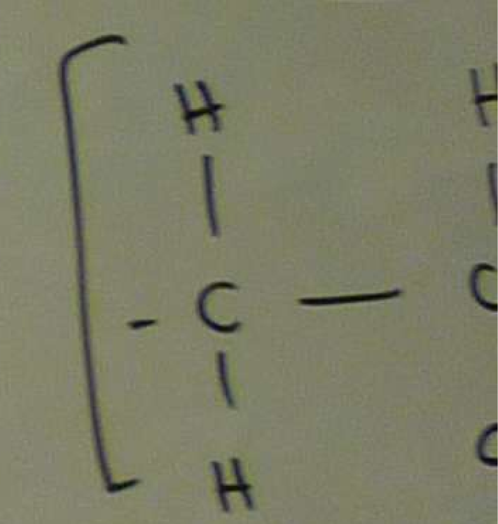


Q26 EXPRESS ...

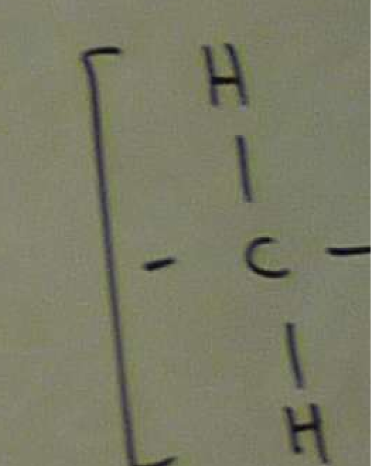
OF

(a) POLY VINYL ...

(a) POLY VINY...



(b)

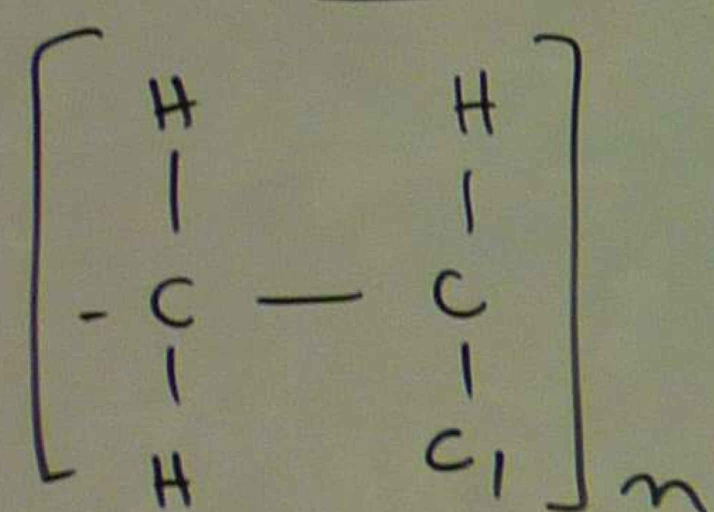


Q26

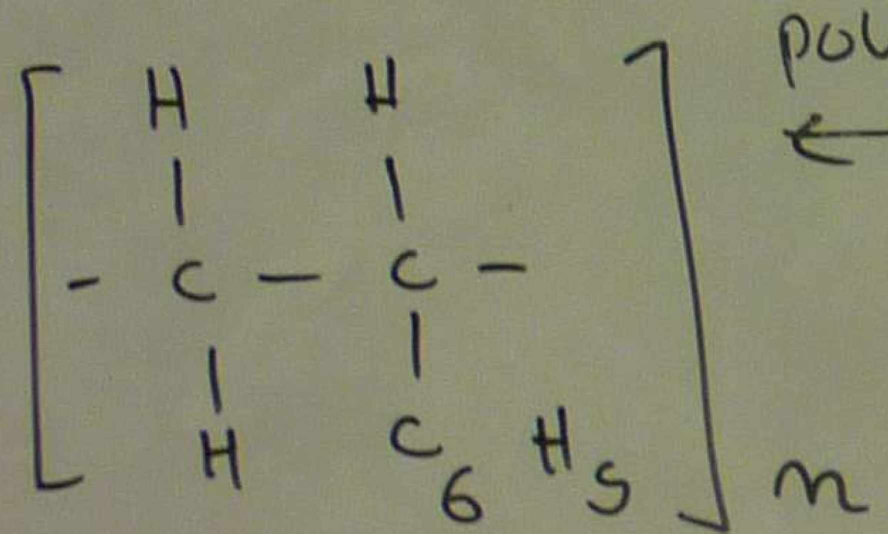
EXPRESS THE CHEMICAL STRUCTURE OF

(a) poly VINYL CHLORIDE (b) POLYSTYRANE

(a) POLY VINYL CHLORIDE



(b) POLYSTYRANE



REFERENCE NOTES

www.electricaldiploma2013.zoomshare.com

E081 MATERIAL SCIENCE

✓ T6 NON METALLIC MATERIALS (ppt)

✓ T3 CONDUCTORS & SEMI CONDUCTOR

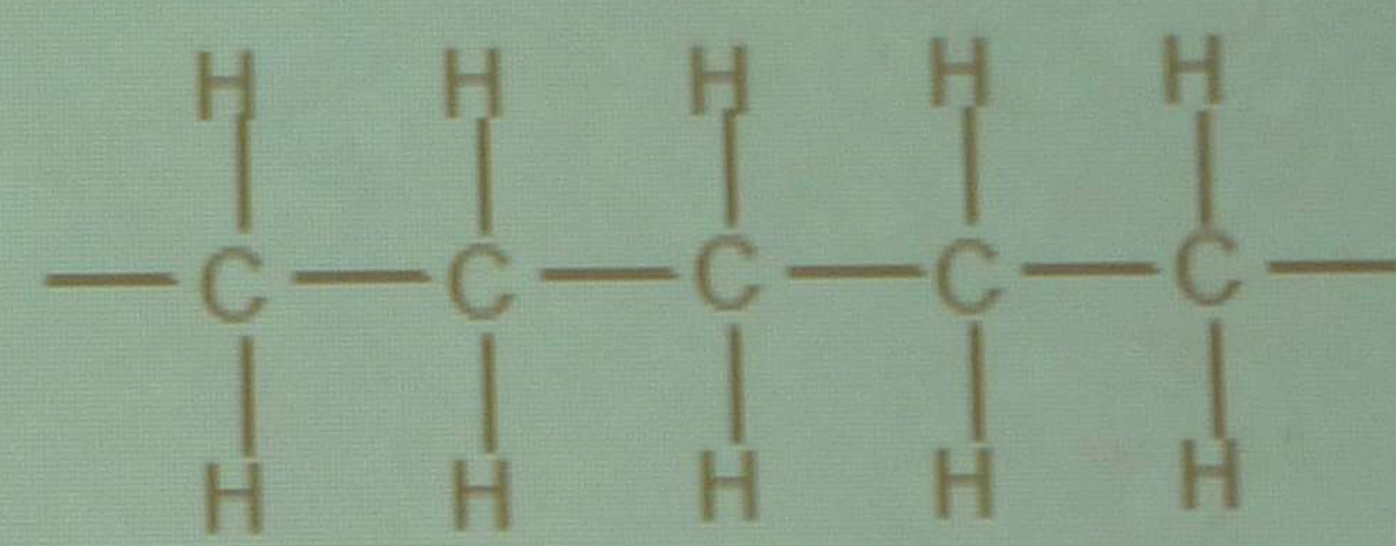
✓ T4 CHEMICAL EFFECT ON MATERIALS
└ CORROSION PROTECTION

T7 MANUFACTURING PROCESS & MATERIALS
TEXT BOOK
PAGE 7 → 13

Properties of polymers

Chemical Composition

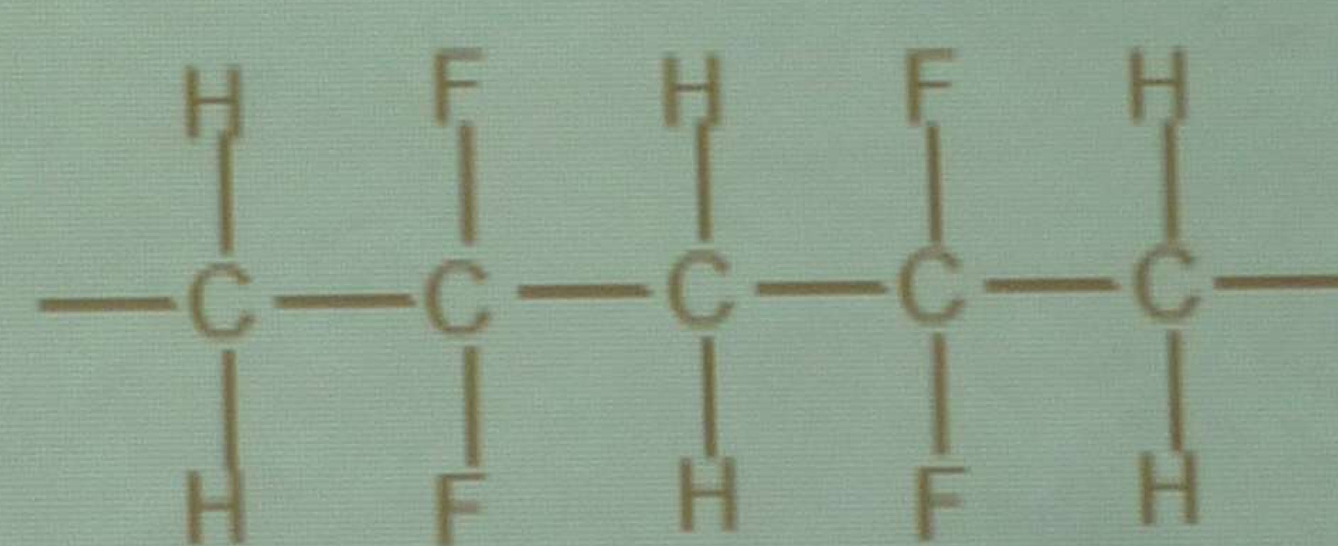
soft to hard, unbreakable, (MWTM)



Polyethylen (PE)

weich bis hart, unzerbrechlich, löslich in einer Vielzahl von Lösungsmitteln (MWTM)

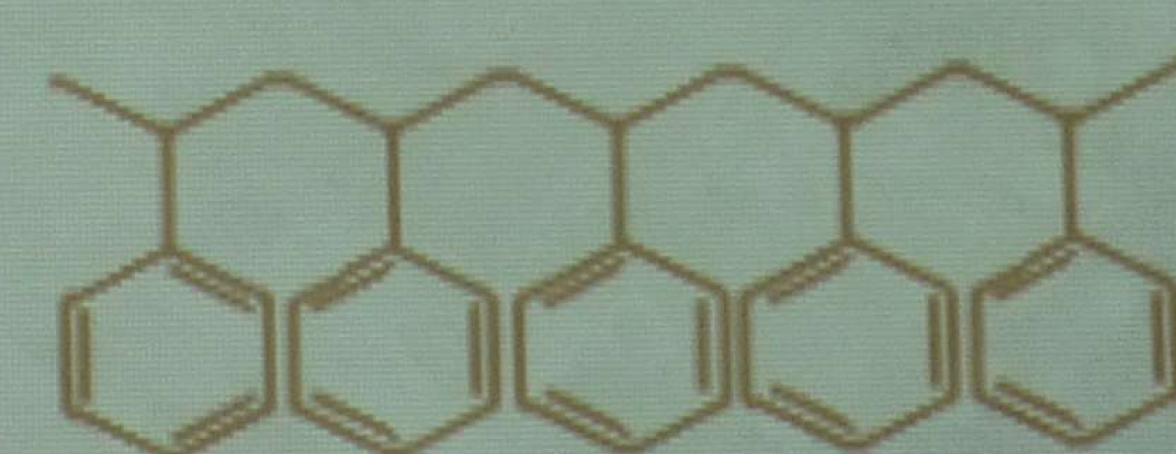
hard, tough, unbreakable, superior chemical resistivity (OBTF)



Polyvinylidenflourid (PVDF)

hart, zäh, unzerbrechlich, hervorragende chem. Beständigkeit (OBTF)

hard, breakable, (plastic spoons and forks, joghurtbeaker)



Polystyrol (PS)

hart, zerbrechlich (z.B. Geodreiecke, Joghurtbecher, Wegwerfbestecke)

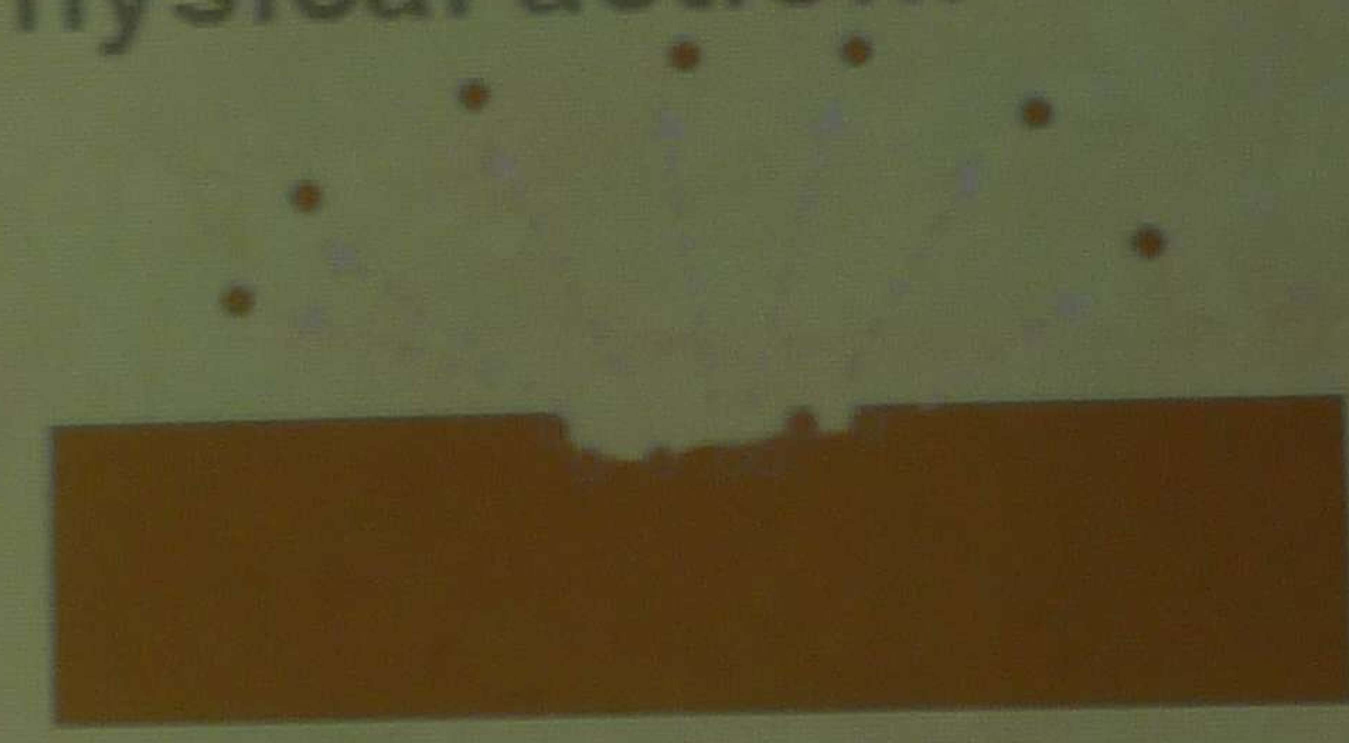

Materials.ppt [Compatibility Mode]
TERT - Key Failure Mechanisms
Sample - Front View
Side View
Tracking failure
(rapid process)
Sample - Front View
Side View
Erosion failure
(slow process)
22 May, 2013
tyco Electronics
to add notes

Anti-Tracking Properties Through Aluminium Tri Hydrate

1. Chemical action:

$$Al_2O_3.3H_2O + 3C \longrightarrow 3CO + Al_2O_3 + 3H_2$$

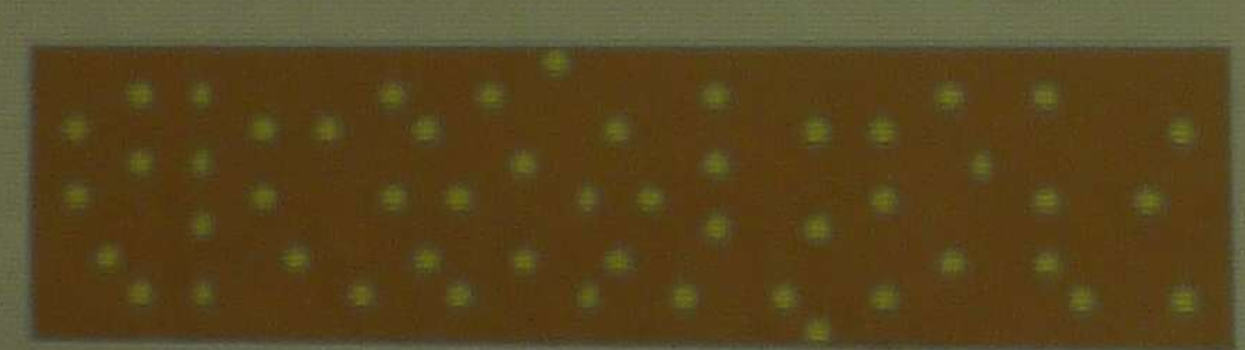
2. Physical action:



$Al_2O_3.3H_2O \longrightarrow$ Steam

3. Volume effect

The amount of fuel (polymer) is reduced by adding ALTH



4. Thermal effect

Endothermic reaction keeps polymer cool

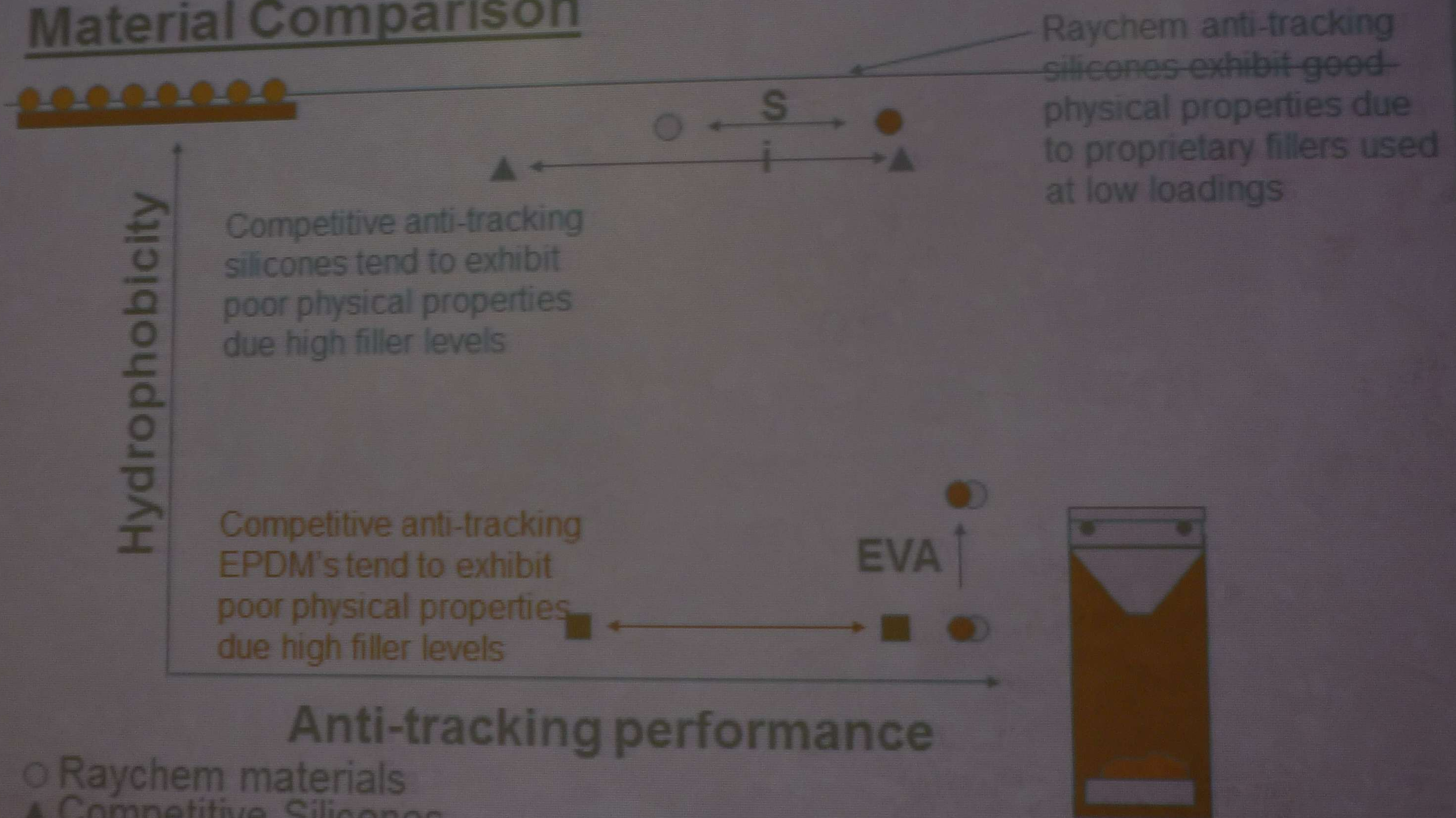
Mechanism Of Iron Oxide

Iron oxide acts as a UV screen and an additional catalyst for oxidation of the char (anti-tracking properties) in silicone materials

Examples of reaction;

$$Fe_2O_3 + C \longrightarrow 2FeO + CO$$
$$Fe + O_2 + 2C \longrightarrow Fe + 2CO$$
$$3Fe + C \longrightarrow Fe_3C$$
$$Fe_2O_3 + 3C \longrightarrow 2Fe + 3CO$$
$$Fe_2O_3 + 11C \longrightarrow 2Fe_3C + 9CO$$

Material Comparison



○ Raychem materials
▲ Competitive Silicones
■ Competitive EPDM's

Base Polymer Tracking Resistance

In general conduction (tracking) is facilitated by a combination of the following factors :

- Chain formation
- Aromaticity
- Conjugation
- Ionic Charge Centers
- Interaction Of Adjacent Charged Zones

Q26

EXPLAIN COVALENT BONDING

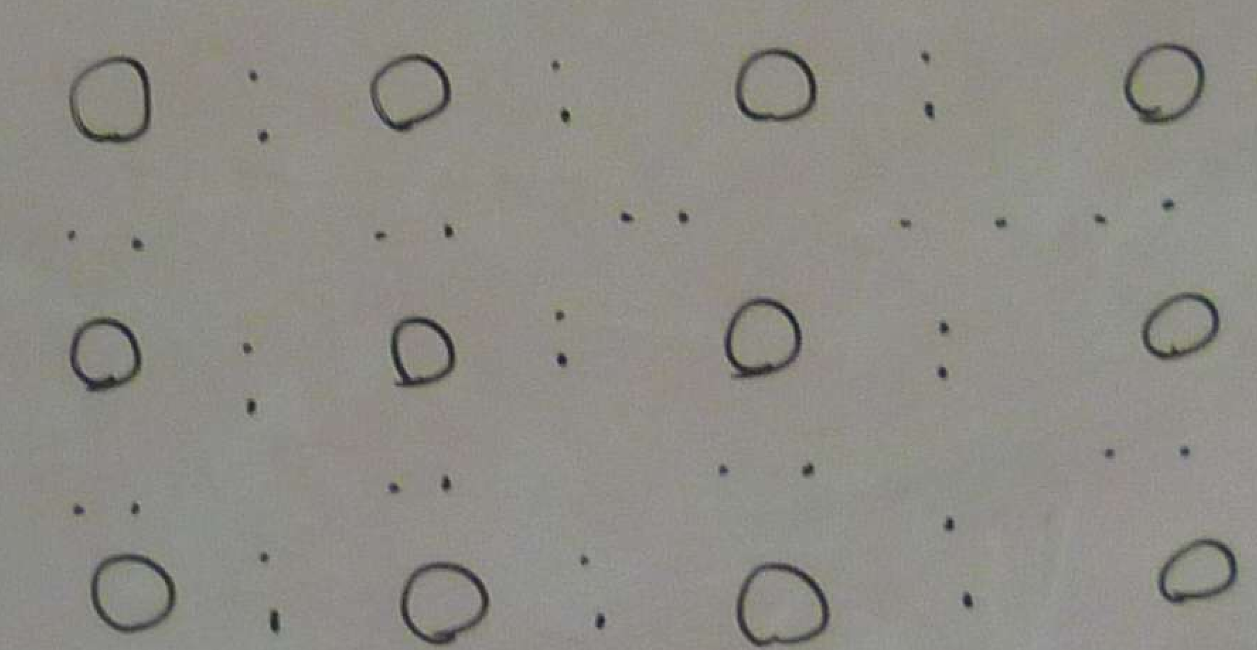
Q27

EXPLAIN ATOMIC STRUCTURE OF METAL

Q28

WHAT IS CRYSTAL?

Q26



THE REPULSIVE FORCE DUE TO OVERLAP OF ELECTRON SHELL FINALLY OVERCOMES ATTRACTIVE FORCE AND THE CRYSTAL FORMS WITH AN ATOMIC SPACING

CORRESPONDING TO MINIMUM E

THE ENERGY CURVES ARE SIMIL

FOR IONIC CRYSTAL.

CARBON, GERMANIUM AND

COVALENT CRYSTALS.

Q27

IN METAL, THE VALAN

ARE SHARED BY ALL ATO

HIGHLY MOBILE, THAT IS

EASILY IN THE CRYSTAL.

A METAL MAY BE CON

AN ASSEMBLY OF POS

IN THE SEA OF NEG

THE ATTRACTIVE FOR

TOGETHER ARE MAIN

FORCE BETWEEN TH

BONDING

STRUCTURE OF METAL

CRYSTAL?

ULSIVE FORCE DUE TO

P OF ELECTRON SHELL

Y OVERCOMES ATTRACTIVE

AND THE CRYSTAL FORMS

AN ATOMIC SPACING

CORRESPONDING TO MINIMUM ENERGY FOR CRYSTAL

THE ENERGY CURVES ARE SIMILAR TO THOSE SHOWN FOR IONIC CRYSTAL.

CARBON, GERMANIUM AND SILICON ARE IMPORTANT COVALENT CRYSTALS.

Q27 IN METAL, THE VALANCE (OUTER MOST) ELECTRONS ARE SHARED BY ALL ATOMS, THIS TAKES THEM HIGHLY MOBILE, THAT IS THEY CAN MOVE ABOUT EASILY IN THE CRYSTAL.

A METAL MAY BE CONSIDERED TO CONSIST OF AN ASSEMBLY OF POSITIVE IONS EMBEDDED IN THE SEA OF NEGATIVE ELECTRONS.

THE ATTRACTIVE FORCE WHICH KEEP THE ATOMS TOGETHER ARE MAINLY COULOMBIC ATTRACTIVE FORCE BETWEEN THE SYSTEM OF POSITIVE

IONS AND NEGATIVE CH

DISTRIBUTION CORRESP

VALANCE ELECTRONS.

COPPER, SILVER, GOLD

NICKELS ARE THIS T

CRYSTALS

Q28 THE CRYSTAL

IS BASED ON THE

TWO POINTS

(a) THE UNIT SH

IS THE SMALLEST

OF CRYSTAL L

OUT OF WHICH

CRYSTAL MAY

BY REPETITI

UNIT CE

IONS AND NEGATIVE CHARGE DISTRIBUTION CORRESPONDING TO VALANCE ELECTRONS.

COPPER, SILVER, GOLD, ALUMINIUM, NICKELS ARE THIS TYPE OF CRYSTALS

Q 28 THE CRYSTAL STRUCTURE IS BASED ON THE FOLLOWING TWO POINTS

(a) THE UNIT SHELL WHICH IS THE SMALLEST ELEMENT OF CRYSTAL LATTICE OUT OF WHICH THE ENTIRE CRYSTAL MAY BE FORMED BY REPEATITION OF THE UNIT CELLS.

(b) THE LATTICE CONSTANT WHICH IS THE LENGTH OF THE UNIT CELL ALONG ONE OF IT'S EDGES.

CHEMICAL EFFECT ON MATERIALS

CHEMICAL IMPACTS ⟶ MATERIAL CORROSION

NON METALLIC MATERIALS SLIDE 68 ⟶ 73

Q49 EXPLAIN CHEMICAL REACTION INSIDE ELECTRIC CELL.

Q50 EXPLAIN CORROSION

Q51 DESCRIBE THE FOLLOWINGS
(a) GALVANIC CORROSION (b) CORROSION REMOVAL
(c) RESISTANCE

Q52 WRITE THE WAYS TO PROTECT CORROSION.

Q53 WHAT ARE THE FORMS OF CORROSION.

HE LENGTH
IT'S EDGES.

MATERIALS

IAL CORROSION

DE 68 → 73

ON INSIDE ELECTRIC CELL.

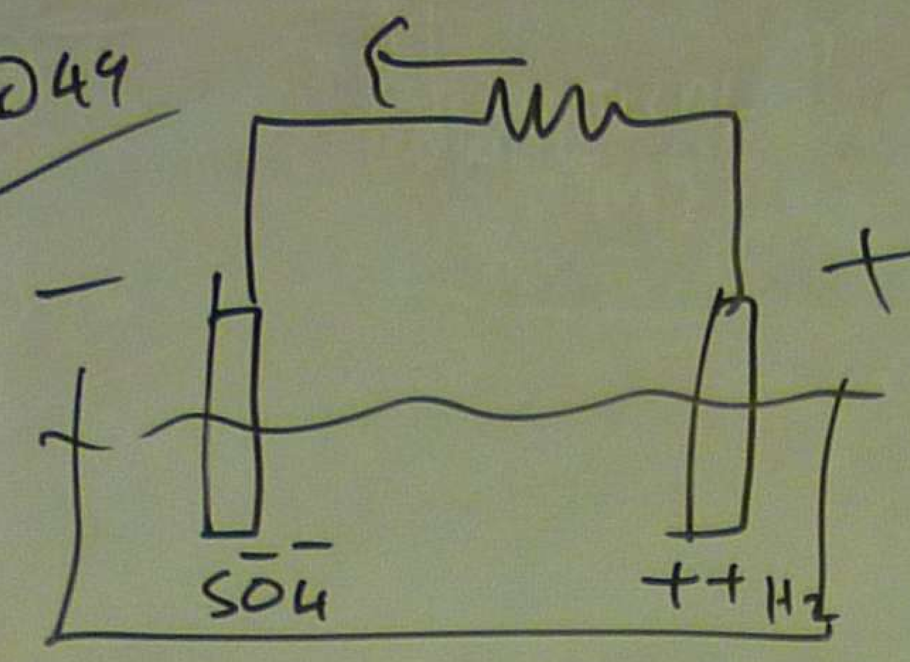
NGS

ON (6) CORROSION REMOVAL

PROTECT CORROSION.

S OF CORROSION.

Q49



H_2SO_4

SPECIAL CHEMICAL REACTION WHICH OCCUR INSIDE THE ELECTRIC CELL RESULT IN OXIDATION AND REDUCTION OF THE SUBSTANCES INSIDE THE CELL THIS PRODUCES ELECTRICAL ENERGY. NORMAL BATTERIES WORK LIKE THIS

Q50 CORROSION IS THE GRADUAL DESTRUCTION OF MATERIALS USUALLY METALS BY CHEMICAL REACTION WITH IT'S ENVIRONMENT. THIS MEANS ELECTRO-CHEMICAL OXIDATION OF METALS IN REACTION WITH OXIDANT SUCH AS OXYGEN. RUSTING, FORMATION OF IRON OXIDE IS A WELL KNOWN EXAMPLE OF OXIDATION.

REFERENCE NOTES

www.electricaldiploma 2c

E081 MATERIAL SCIENCE

✓ T6 NON METALLIC MATERIALS

✓ T3 CONDUCTORS & SEMI CO

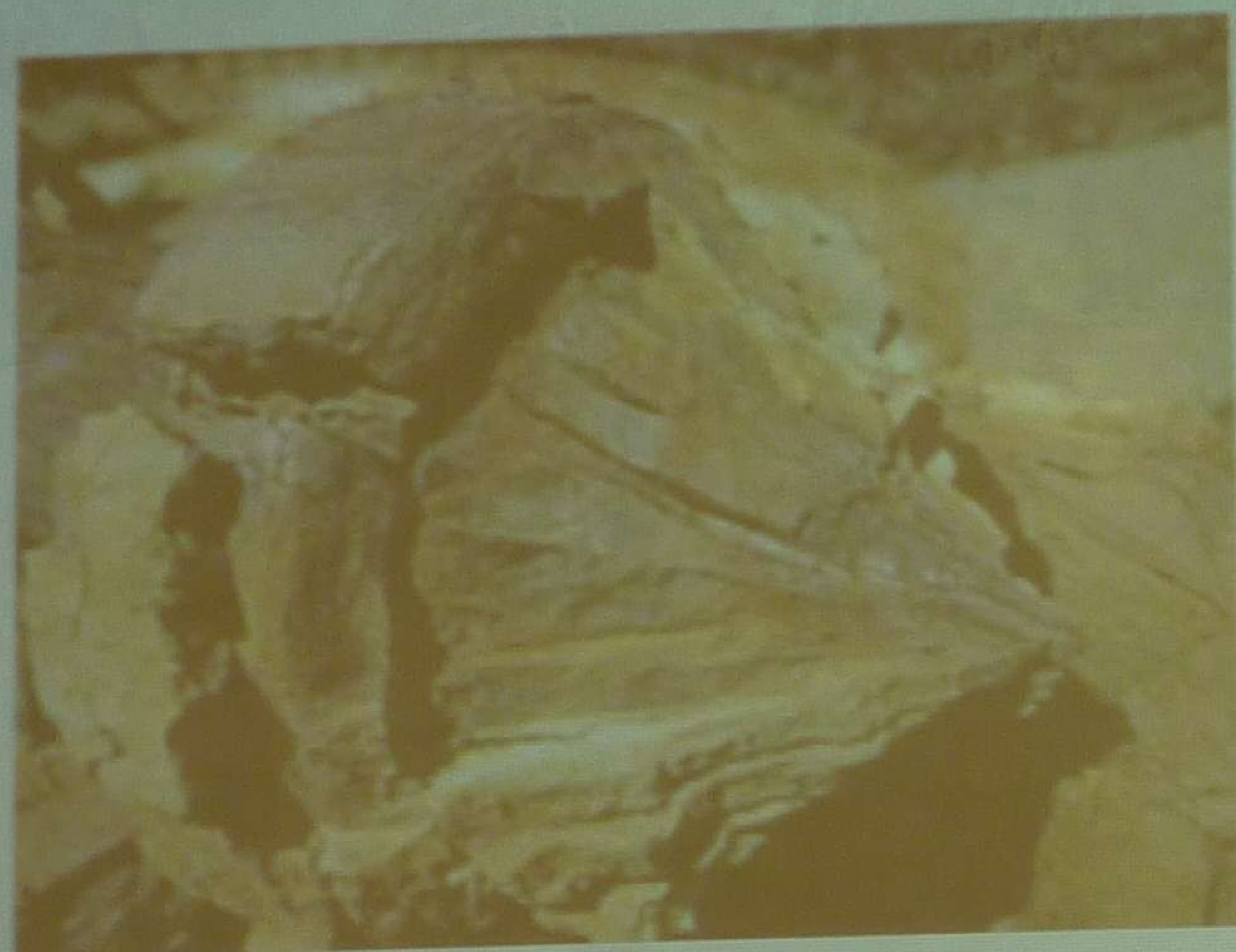
✓ T4 CHEMICAL EFFECT ON

T7 MANUFACTURING PROC

TEXT

PAGE

Rust, the most familiar example of corrosion.



Volcanic gases have accelerated the corrosion of this abandoned mining machinery.

Corrosion on exposed metal

N

3

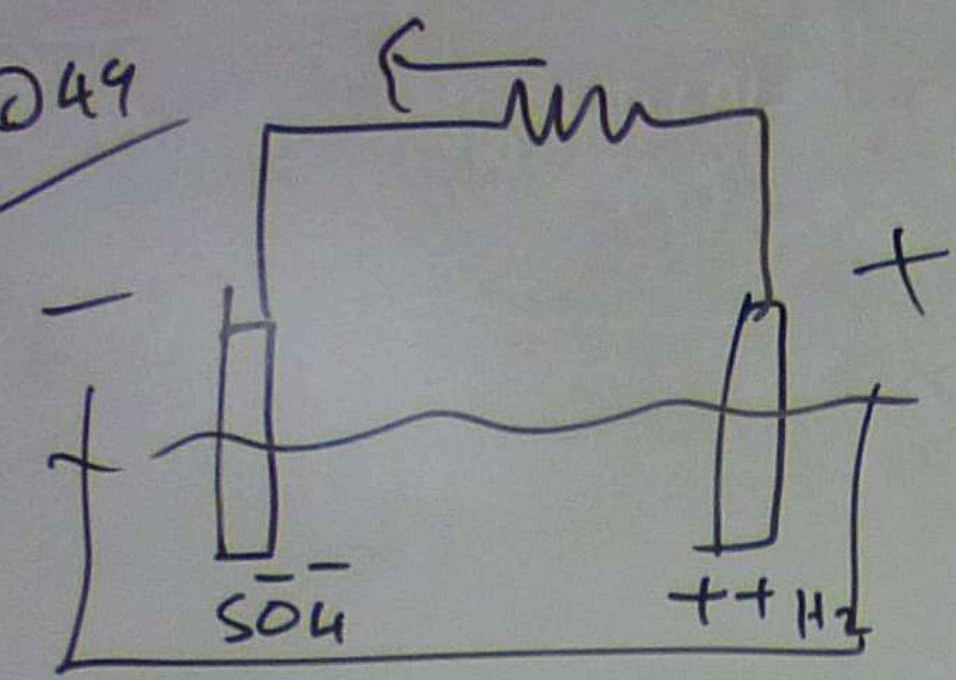
ECTRIC CELL.

ON REMOVAL

SION.

N.

Q49



H_2SO_4

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Q50 CORROSION IS THE GRADUAL DESTRUCTION OF MATERIALS USUALLY METALS BY CHEMICAL REACTION WITH IT'S ENVIRONMENT.

THIS MEANS ELECTRO-CHEMICAL OXIDATION OF METALS IN REACTION WITH OXIDANT SUCH AS OXYGEN. RUSTING, FORMATION OF IRON OXIDE IS A WELL KNOWN EXAMPLE OF OXIDATION.

REFERENCE NOTES

www.electricaldiploma2013.zoomsh

E081 MATERIAL SCIENCE

✓ T6 NON METALLIC MATERIALS (ppt)

✓ T3 CONDUCTORS & SEMI CONDUCTOR

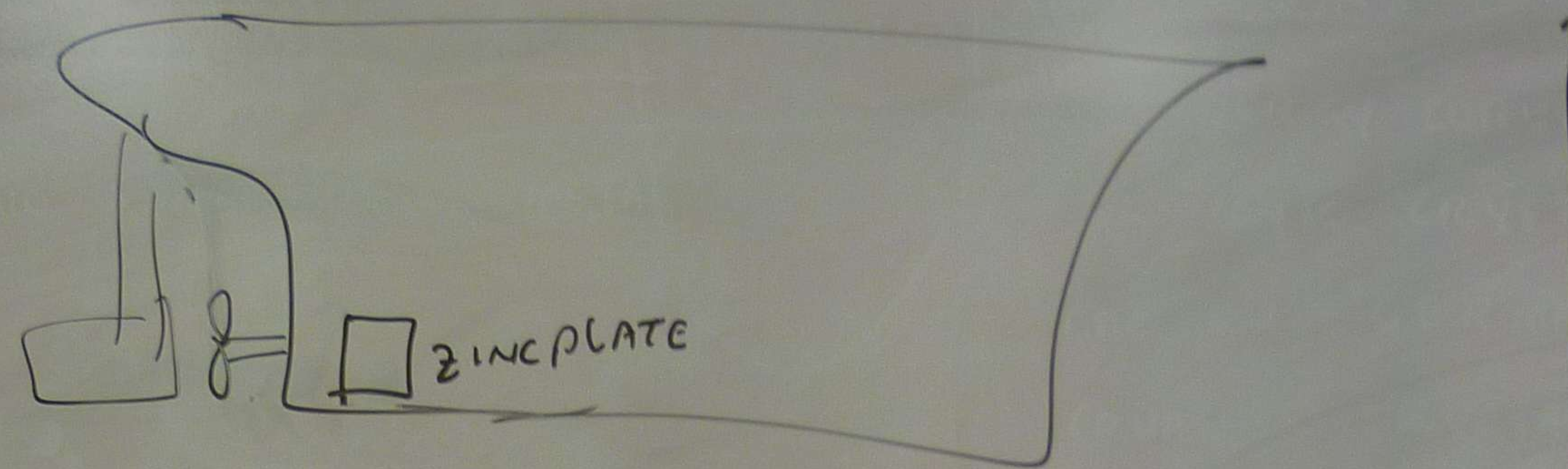
✓ T4 CHEMICAL EFFECT ON MATERIALS
└ CORROSION

T7 MANUFACTURING PROCESS & MATE

TEXT BOOK

PAGE 7 → 13

Volcanic gases have accelerated the corrosion of this abandoned mining machinery.



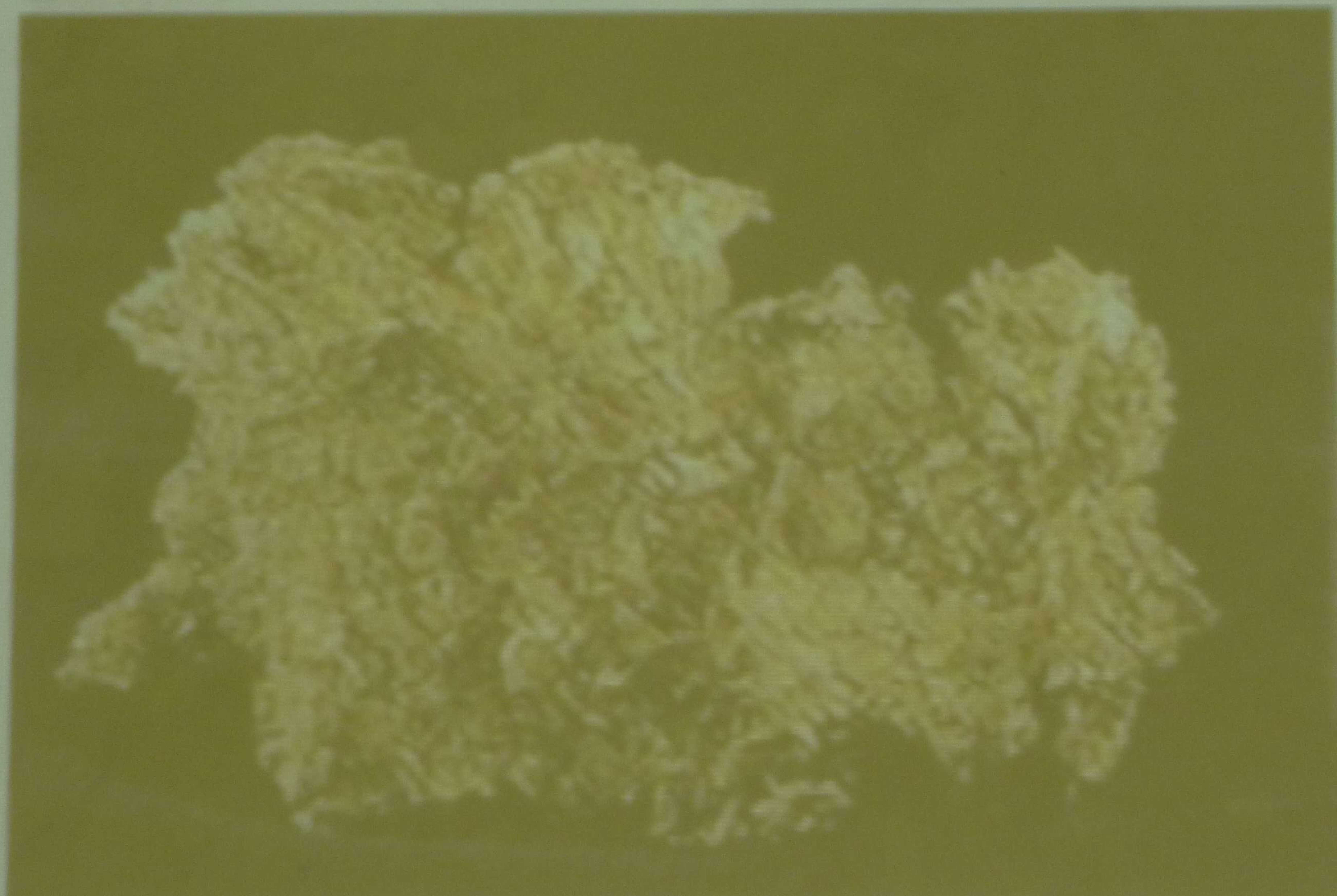
Q 51 (a) GALVANIC CORROSION OCCURS WHEN TWO DIFFERENT METALS HAVE PHYSICAL (OR) ELECTRICAL CONTACT WITH EACH OTHER AND ARE IMMERSED IN A COMMON ELECTROLYTE, OR WHEN THE SAME METAL IS EXPOSED TO ELECTROLYTE WITH DIFFERENT CONCENTRATIONS.

IN A GALVANIC COUPLE, THE MORE ACTIVE METAL (THE ANODE) CORRODES AT AN ACCELERATE RATE AND THE MORE NOBLE METAL (THE CATHODE) CORRODES AT A RETARDED RATE.

[edit] Galvanic corrosion

Main article: Galvanic corrosion

[edit] Intrinsic chemistry



Q S1 (b) IT IS POSSIBLE TO CHEMICALLY REMOVE THE PRODUCTS OF CORROSION. FOR EXAMPLE, PHOSPHORIC ACID IN THE FORM OF NAVAL JELLY IS OFTEN APPLIED TO FERROUS TOOLS (OR) SURFACES TO REMOVE RUST.

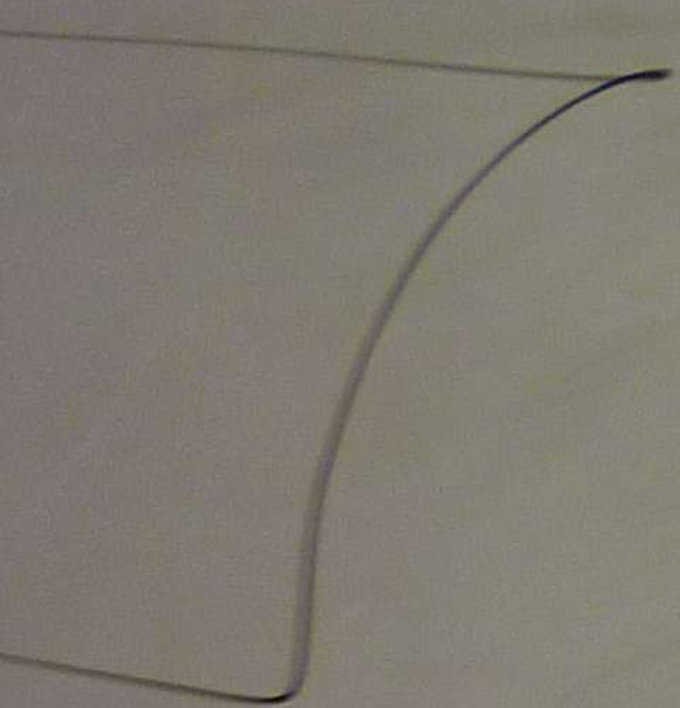
(b)

QS1 (C) SOME METALS ARE MORE INTRINSICALLY RESISTANT TO CORROSION THAN OTHERS. THERE ARE VARIOUS WAYS OF PROTECTING METALS FROM CORROSION INCLUDING PAINTING, HOT DIP GALVANIZING AND COMBINATION OF THESE.

Q

E

E)



WHEN TWO
AL (OR) ELECTRICAL
ARE IMMERSED
WHEN THE SAME
TE WITH DIFFERENT

ORE ACTIVE METAL
ACCELERATE RATE
TAL (THE CATHODE)
RATE.

Q51(b) It is possible to chemically remove the products of corrosion. For example, phosphoric acid in the form of naval jelly is often applied to ferrous tools (or) surfaces to remove rust.

Q51(c) Some metals are more intrinsically resistant to corrosion than others. There are various ways of protecting metals from corrosion including painting, hot dip galvanizing and combination of these.

Q52
- Reacting coating
- Anodization
- Biofilm coating
- Cathodic protection
- Sacrificial anode protection
- Impressed current cathodic protection.

(b) THE
OF THE

CHE

Q49

Q50

Q51

Q5

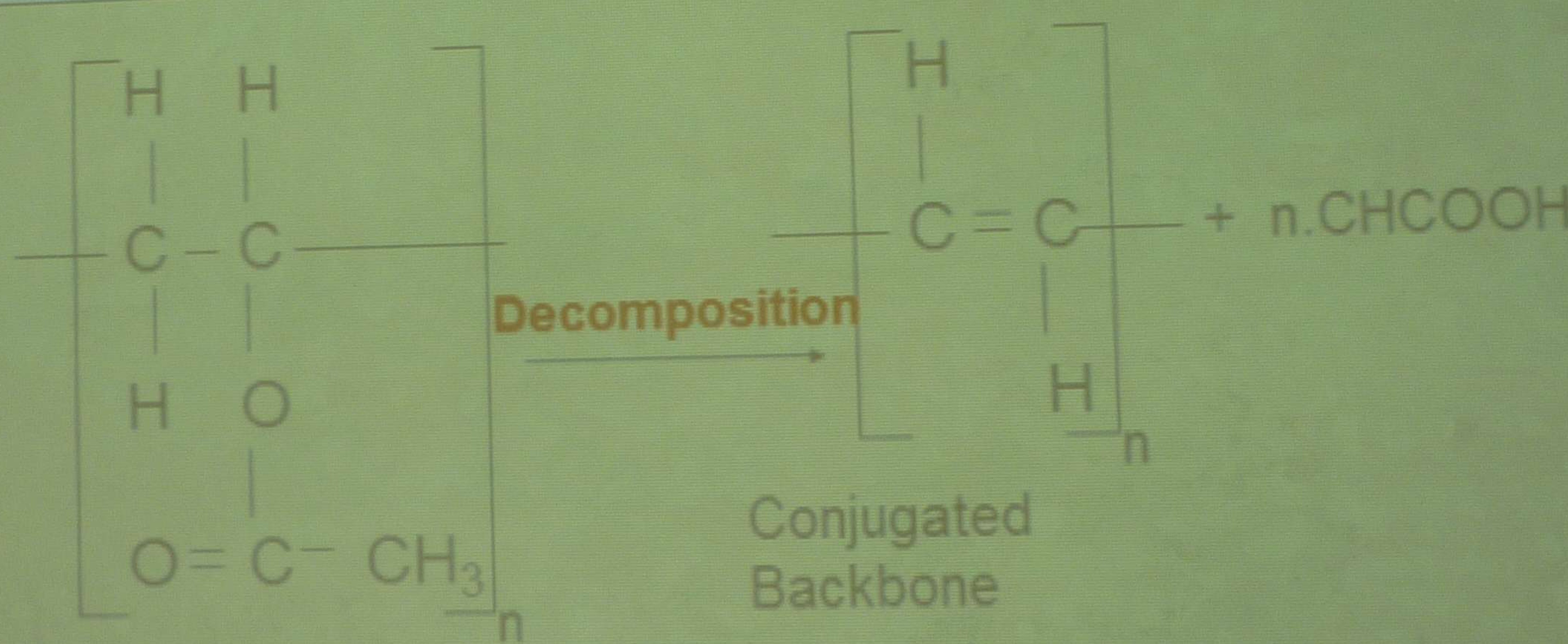
Base Polymer Tracking Resistance

	Dust-Fog (hours)
Polyvinyl chloride	0.3
Polystyrene	0.9
Polyvinyl acetate	1
Polyethylene	33
Poly methyl methacrylate	162
Polytetrafluoroethylene	600

Tracking performance is associated with a materials tendency to form a conductive char residue on decomposition.

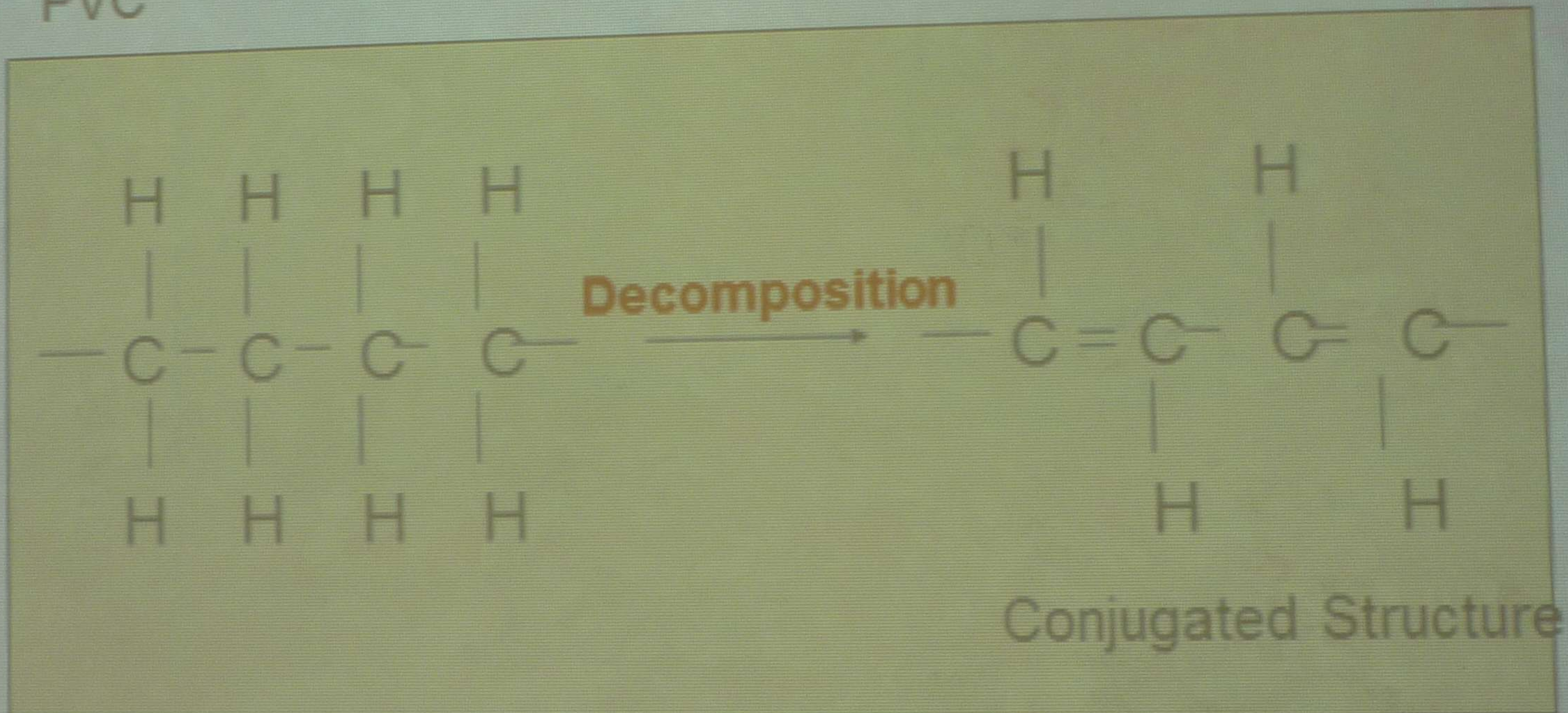
Example Of A Track Prone Polymer

EVA (Base polymer used for HVOT)



Example Of A Track Prone Polymer

PVC



Conduction occurs via electron transfer :

$$—CH\overset{e}{=}CH—\ CH\overset{e}{=}CH— \rightarrow —CH-CH=CH-CH—$$


Materials.ppt [Compatibility Mode] - Microsoft PowerPoint
Transitions
Animations
Slide Show
Review
View
Adobe Presenter
Acrobat
Layout
Reset
Section
Slides
Font
Text Direction
Align Text
Convert to SmartArt
Paragraph
Arrange
Quick Styles
Drawing
Shape Fill
Shape Outline
Shape Effects
Find
Replace
Select
Editing
Polymer / Elastomer Base
Polymers
Elastomers
The Magic Dust!!
Special / Proprietary Additives
Fillers
Anti-Tracking Fillers
Carbon Blacks
Other Fillers
Example - Semi-conductive (Stress grading)
JSCR
Cross-linking Agents
Peroxide
Prorad
Iron Oxide
Thermal Stabilisers
UV Stabilisers
Process Aids
Oils
Additives
22 May, 2013
tyco Electronics
add notes


Materials.ppt [Compatibility Mode] - Microsoft PowerPoint
Design
Transitions
Animations
Slide Show
Review
View
Adobe Presenter
Acrobat
Layout
Reset
Section
New Slide
Slides
Font
Text Direction
Align Text
Convert to SmartArt
Paragraph
Arrange
Quick Styles
Shape Fill
Shape Outline
Shape Effects
Drawing
Find
Replace
Select
Editing
Polymer / Elastomer Base
Polymers
Elastomers
The Magic Dust!!
Special / Proprietary Additives
Fillers
Anti-Tracking Fillers
Carbon Blacks
Other Fillers
Example - Semi-conductive (Stress grading)
JSCR
Cross-linking Agents
Peroxide
Prorad
Iron Oxide
Thermal Stabilisers
UV Stabilisers
Process Aids
Oils
Additives
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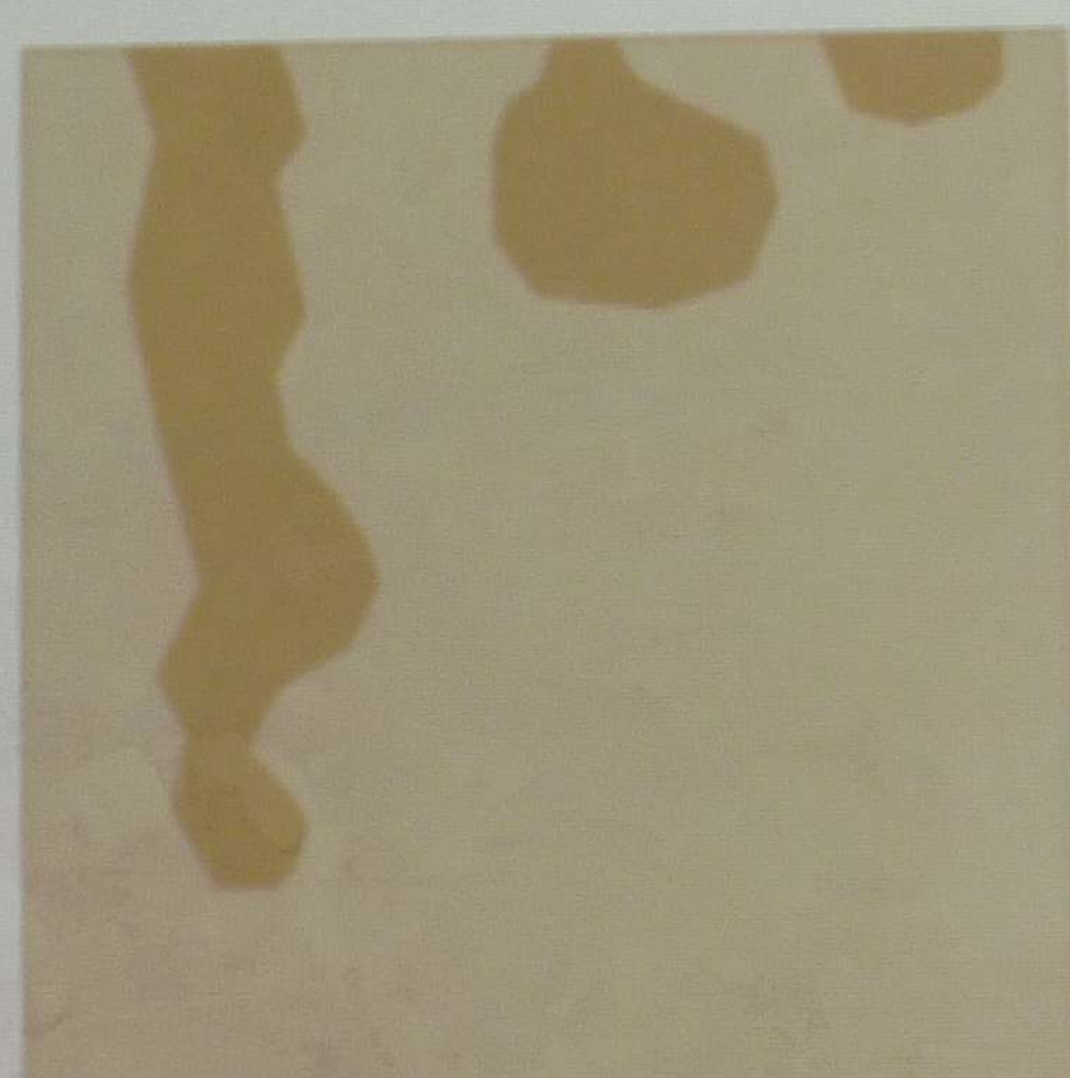
ck to add notes

[edit] Corrosion in passivated materials

Passivation is extremely useful in mitigating corrosion damage, however even a high-quality alloy will corrode if its ability to form a passivating film is hindered. Proper selection of the right grade of material for the specific environment is important for the long-lasting performance of this group of materials. If breakdown occurs in the passive film due to chemical or mechanical factors, the resulting major modes of corrosion may include pitting corrosion, crevice corrosion and stress corrosion cracking.

[edit] Pitting corrosion

Main article: Pitting corrosion



The scheme of pitting corrosion

its name implies, corrosion is limited to a very narrow zone adjacent to the weld, often only a few micrometers across, making it even less noticeable.

[edit] Crevice corrosion

Main article: Crevice corrosion

Corrosion in the crevice between the tube and tube sheet (both made of type-316 stainless steel) of a heat exchanger in a seawater desalination plant.[4]

UE THE PRODUCTS
IN THE FORM OF
OUS TOOLS (OR)

Y RESISTANT TO
US WAYS OF
NG PAINTING,
THESE.

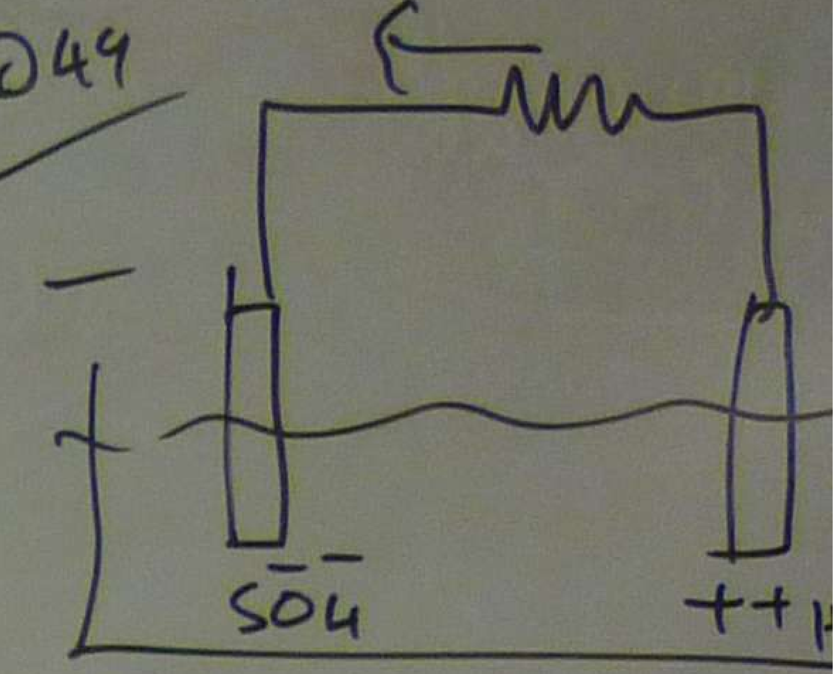
AL ANODE

ED CURRENT
PROTECTION.

BASE POLYMER TRACKING RESISTANCE

Q53
- PITTING CORROSION
- CREVICE CORROSION
- MICROBIAL CORROSION
- HIGH TEMPERATURE CORROSION
- METAL DUSTING

Q49



SPECIAL CHEM
OCCUR INSIDE
RESULT IN OXI
OF THE SUBST
THIS PRODUCES
NORMAL BATT

Q50 CORROSIO
DESTRUCTION
USUALLY
REACTION W
THIS MEANS
OF METAL
OXIDANT S

RESISTANCE

RROSION

CRACKING

FOLLOWINGS

STEEL (C) ALUMINIUM

QS4

STRESS CORROSION CRACKING (SCC) IS CAUSED BY THE SIMULTANEOUS EFFECTS OF TENSILE STRESS AND A SPECIFIC CORROSIVE ENVIRONMENT. STRESSES MAY BE DUE TO APPLIED LOADS. RESIDUAL STRESSES FROM THE MANUFACTURING PROCESS (OR) COMBINATION OF BOTH.

REFERENCE NOTE

www.electrical dip

E081 MATERIAL S

✓ T6 NON METALLIC M

✓ T3 CONDUCTORS &

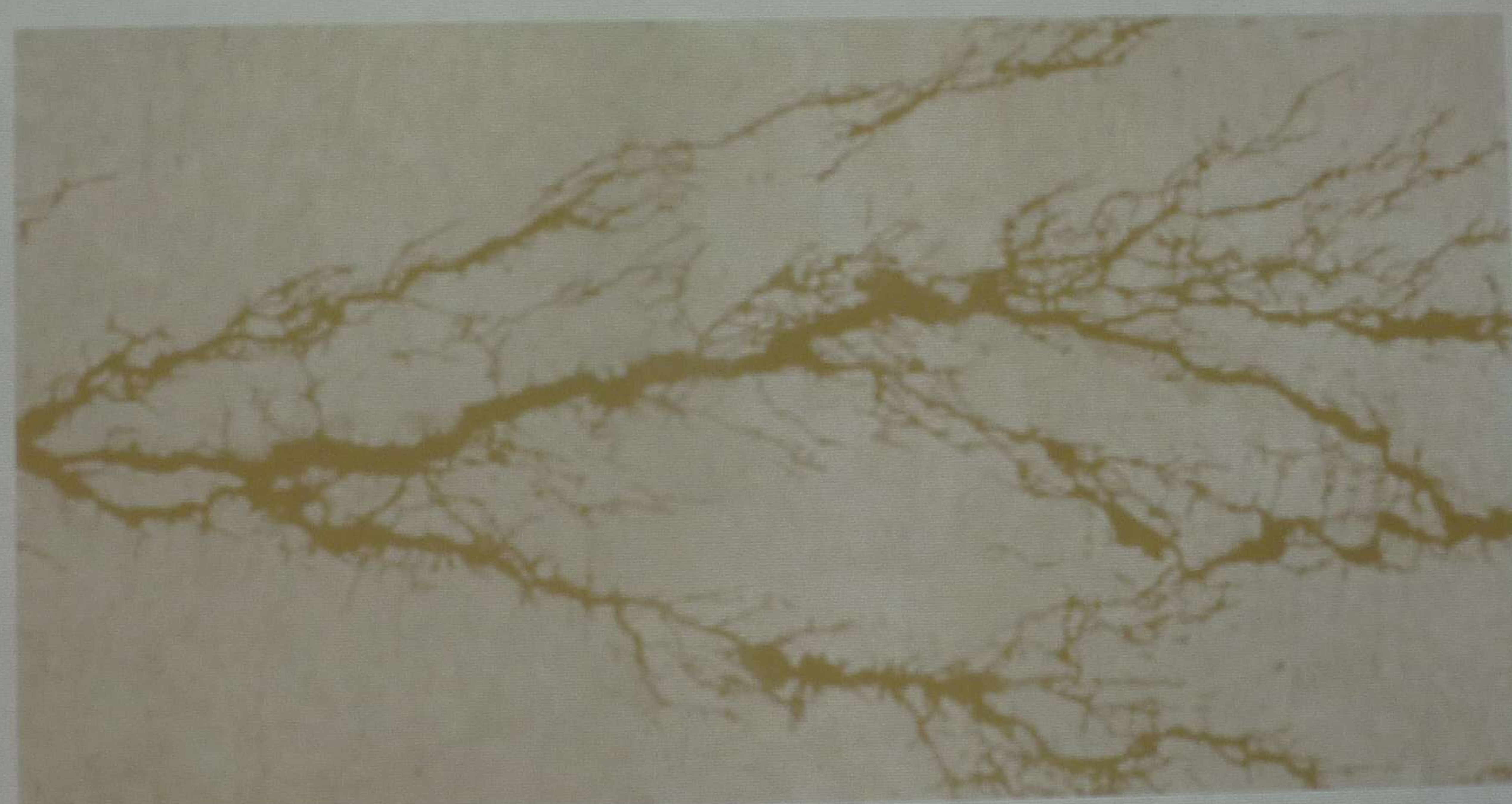
✓ T4 CHEMICAL EFF

T7 MANUFACTURI

The picture on the left shows exfoliation of aluminum. Exfoliation of carbon steel is apparent in the channel on the coating exposure panel on the right. The expansion of the metal caused by exfoliation corrosion can create stresses that bend or break connections and lead to structural failure.

Stress Corrosion Cracking

Stress corrosion cracking (SCC) is caused by the simultaneous effects of tensile stress and a specific corrosive environment. Stresses may be due to applied loads, residual stresses from the manufacturing process, or a combination of both.



Cross sections of SCC frequently show branched cracks. This river branching pattern is unique to SCC and is used in failure analysis to identify when this form of corrosion has occurred.

The photo below shows SCC of an insulated stainless-steel condensate line. Water wetted the

MICALLY REMOVE THE PRODUCTS
OSPHORIC ACID IN THE FORM OF
LIED TO FERROUS TOOLS (OR)

INTRINSICALLY RESISTANT TO
E ARE VARIOUS WAYS OF
ROSION INCLUDING PAINTING,
MBINATION OF THESE.

- SACRIFICIAL ANODE PROTECTION
- IMPRESSED CURRENT CATHODIC PROTECTION.

BASE POLYMER TRACKING RESISTANCE

Q53
- PITTING CORROSION
- CREVICE CORROSION
- MICROBIAL CORROSION
- HIGH TEMPERATURE CORROSION
- METAL DUSTING

Q54 EXPRESS STRESS CORROSION CRACKING

Q55 WRITE NOTES FOR THE FOLLOWINGS
(a) CARBON STEEL (b) STAINLESS STEEL (c) ALUMINIUM
(d) COPPER ALLOY.

Q54 STRE
(SCC) IS
EFFECTS O
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LOADS. RE
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Q55 (a)
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QS4

STRESS CORROSION CRACKING (SCC) IS CAUSED BY THE SIMULTANEOUS EFFECTS OF TENSILE STRESS AND A SPECIFIC CORROSIVE ENVIRONMENT. STRESSES MAY BE DUE TO APPLIED LOADS. RESIDUAL STRESSES FROM THE MANUFACTURING PROCESS (OR) COMBINATION OF BOTH.

QS5 (a) CARBON STEEL

MOST LARGE METAL STRUCTURES ARE MADE FROM CARBON STEEL

MIXING THE STEEL WITH APPROPRIATE CARBON CONTENT, CORROSION PROTECTION CAPABILITY CAN BE ACHIEVED.

Some forms of CARBON STEELS ARE SUBJECT TO SPECIAL TYPES of CORROSION SUCH AS HYDROGEN EMBRITTLEMENT

- PROTECTIVE COATING, CATHODIC PROTECTION AND CORROSION INHIBITORS ARE ALL EXTENSIVELY USED TO PROLONG THE LIFE OF CARBON STEEL STRUCTURES

(b) STAINLESS STEELS ARE BASED ON THE FORMULA OF IRON WITH 18% CHROMIUM AND 8% NICKEL. THEY ARE IMMUNE TO CORROSION BUT STAINLESS STEELS ARE SUBJECT TO PITTING, CREVICE CORROSION AND STRESS CORROSION CRACKING

(c) - FAVOURABLE STRENGTH TO WEIGHT RATIO
- AERO SPACE APPLICATION

(d) BRASSES (COPPER + ZINC) AND BRONZES (COPPER + TIN) ARE COMMONLY USED FOR VALVES AND FITTINGS BUT THEY CAN FACE STRESS CORROSION CRACKING IN THE PRESENCE OF AMMONIA COMPOUND.

Q54

Stress corrosion cracking (SCC) is caused by the simultaneous effects of tensile stress and a specific corrosive environment. Stresses may be due to applied loads. Residual stresses from the manufacturing process (or) combination of both.

Q55 (a) Carbon steel

Most large metal structures are made from carbon steel. Mixing the steel with appropriate carbon content, corrosion protection capability can be achieved.

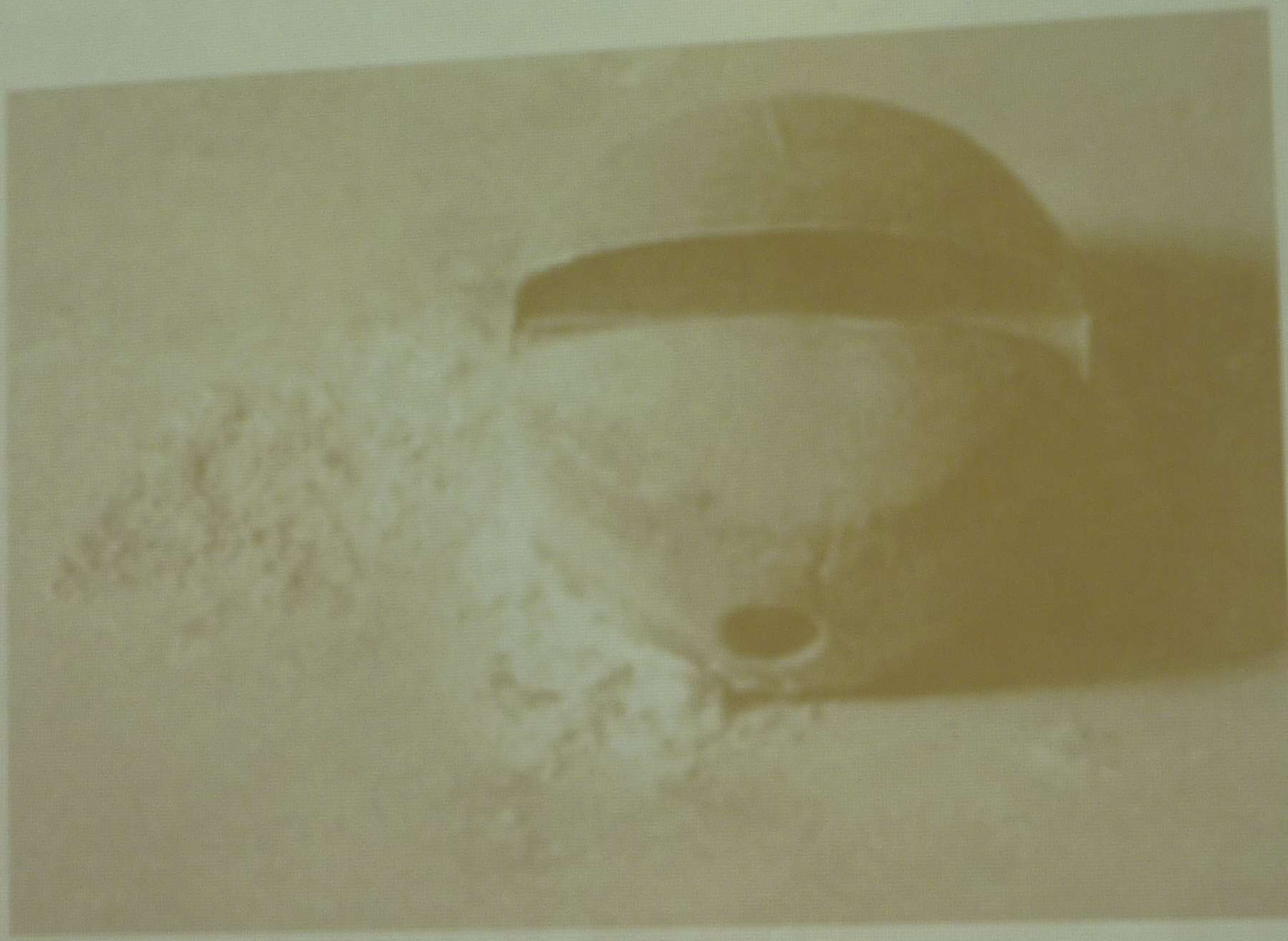
Some forms of carbon steels are subject to special types of corrosion such as hydrogen embrittlement.

- Protective coating, cathodic protection and corrosion inhibitors are all extensively used to prolong the life of carbon steel structures.

(b) Stanless steels are based on the formula of iron with 18% chromium and 8% nickel. They are immune to corrosion but stainless steels are subject to pitting, crevice corrosion and stress corrosion cracking.

(c) - Favourable strength to weight ratio
- Aero space application

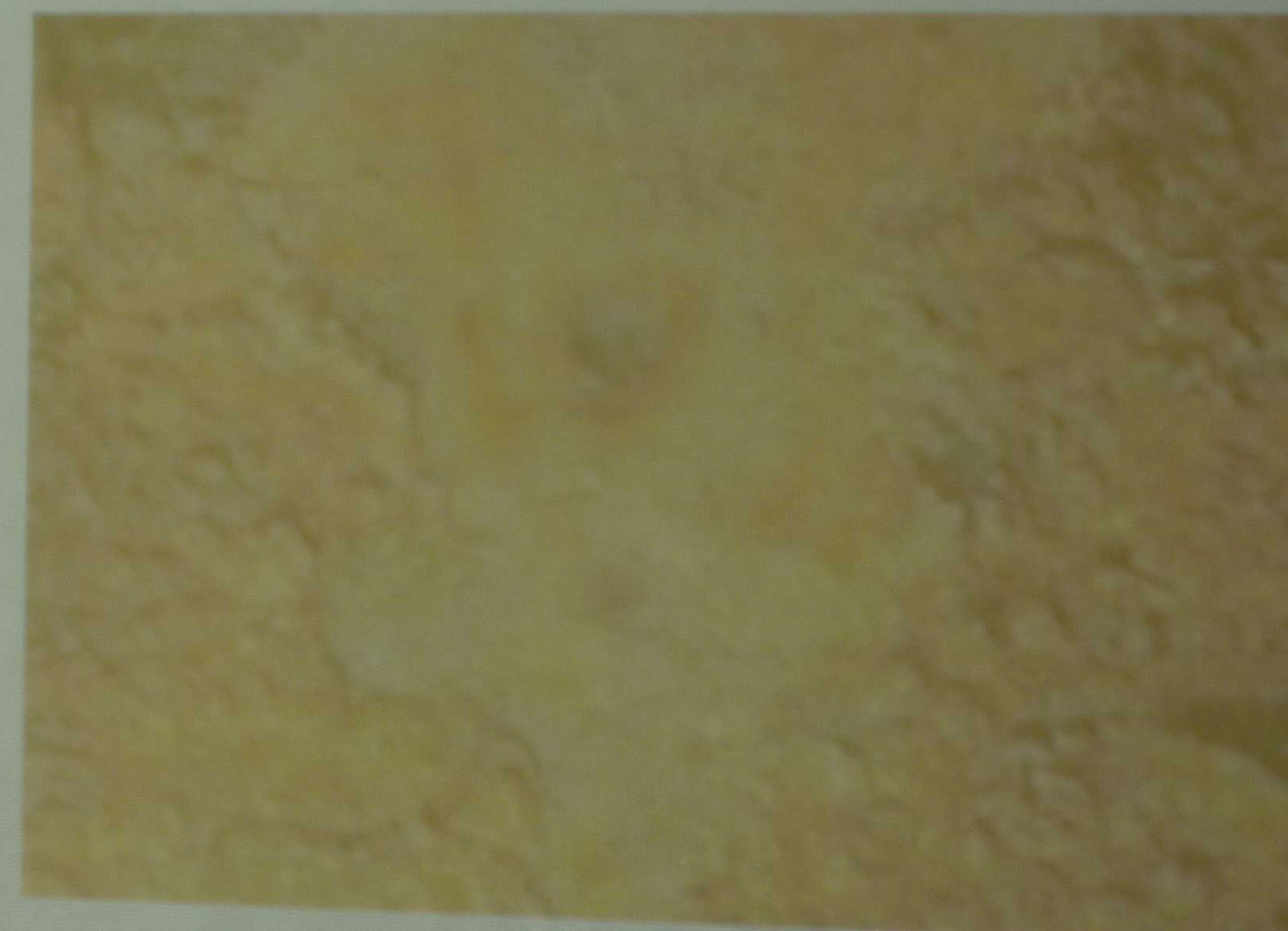
(d) Brasses (copper + zinc) and bronzes (copper + tin) are commonly used for valves and fittings but they can face stress corrosion cracking in the presence of ammonia compound.



Concentration Cell Corrosion

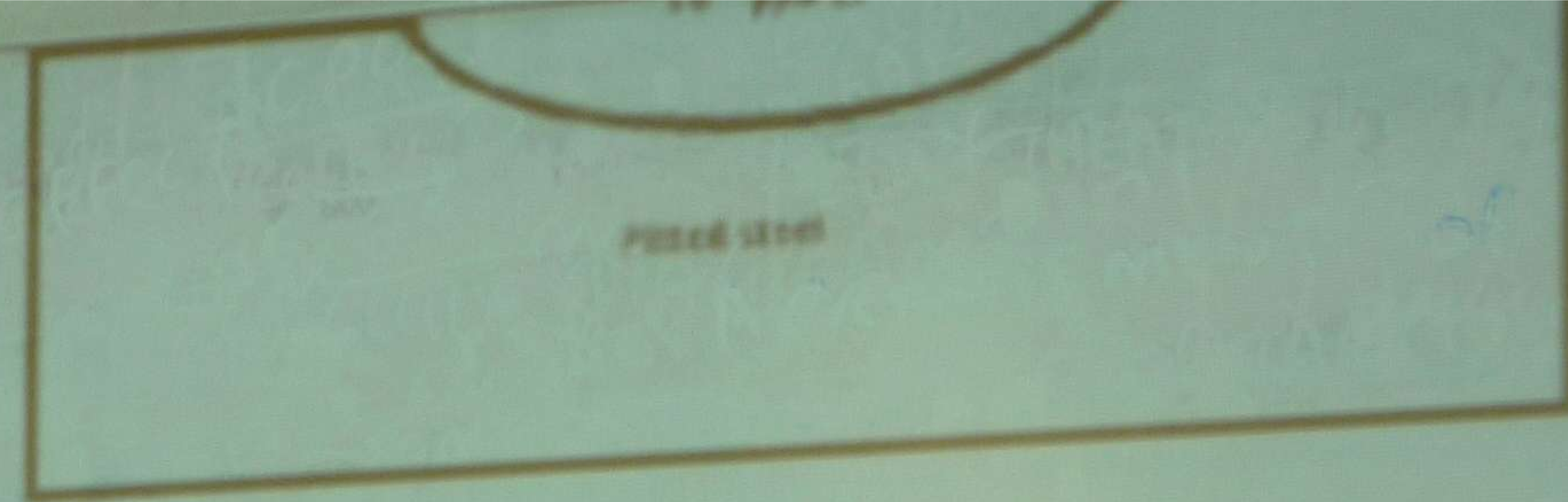
on cell corrosion occurs when two or more areas of a metal surface are in contact wit
ntrations of the same solution. There are three general types of concentration cell

that can be used to control pitting include maintaining clean surfaces, application of a protective coating, and use of inhibitors or cathodic protection for immersion service. Molybdenum additions to stainless steel (e.g. in 316 stainless) are intended to reduce pitting corrosion.

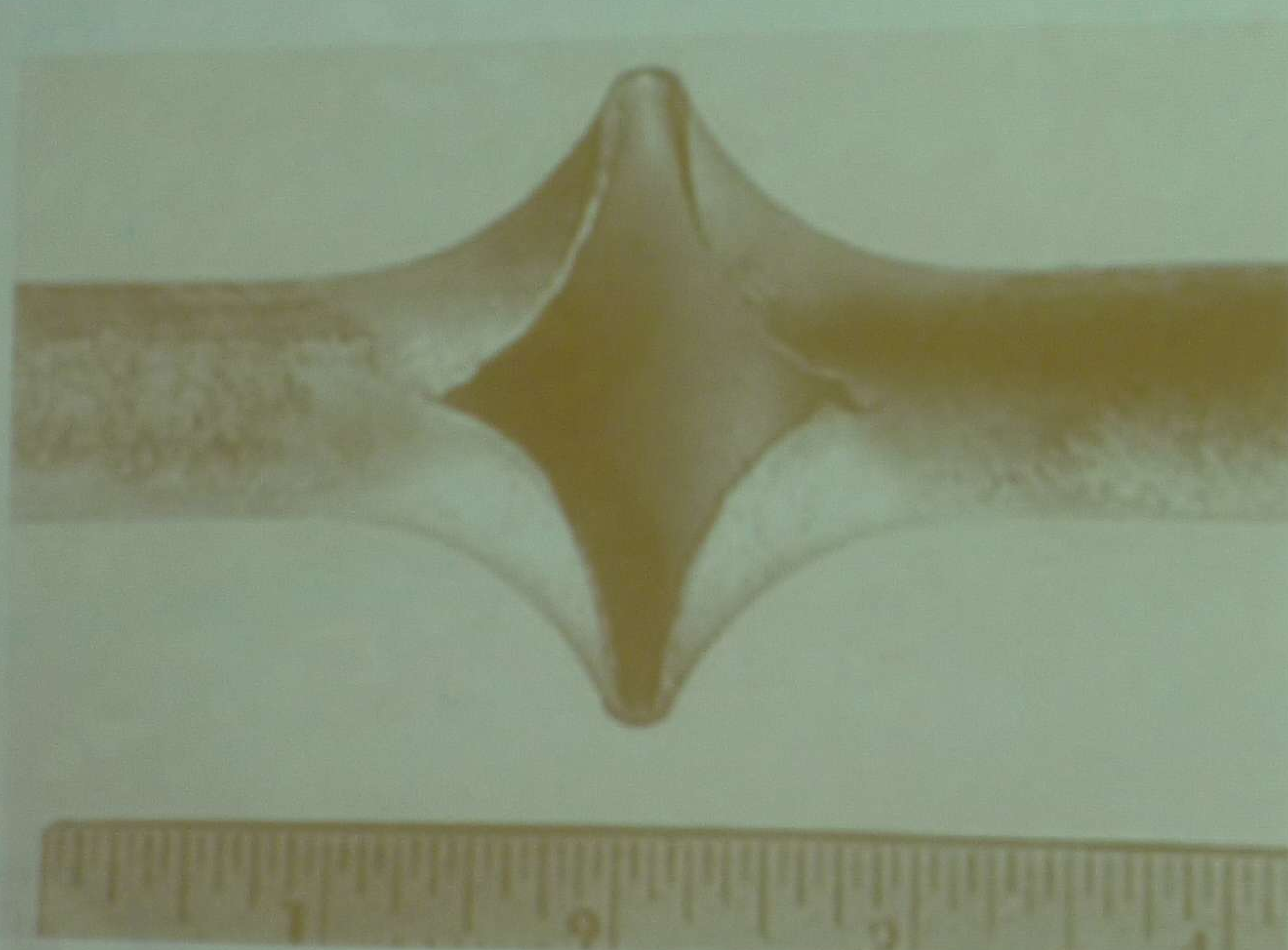


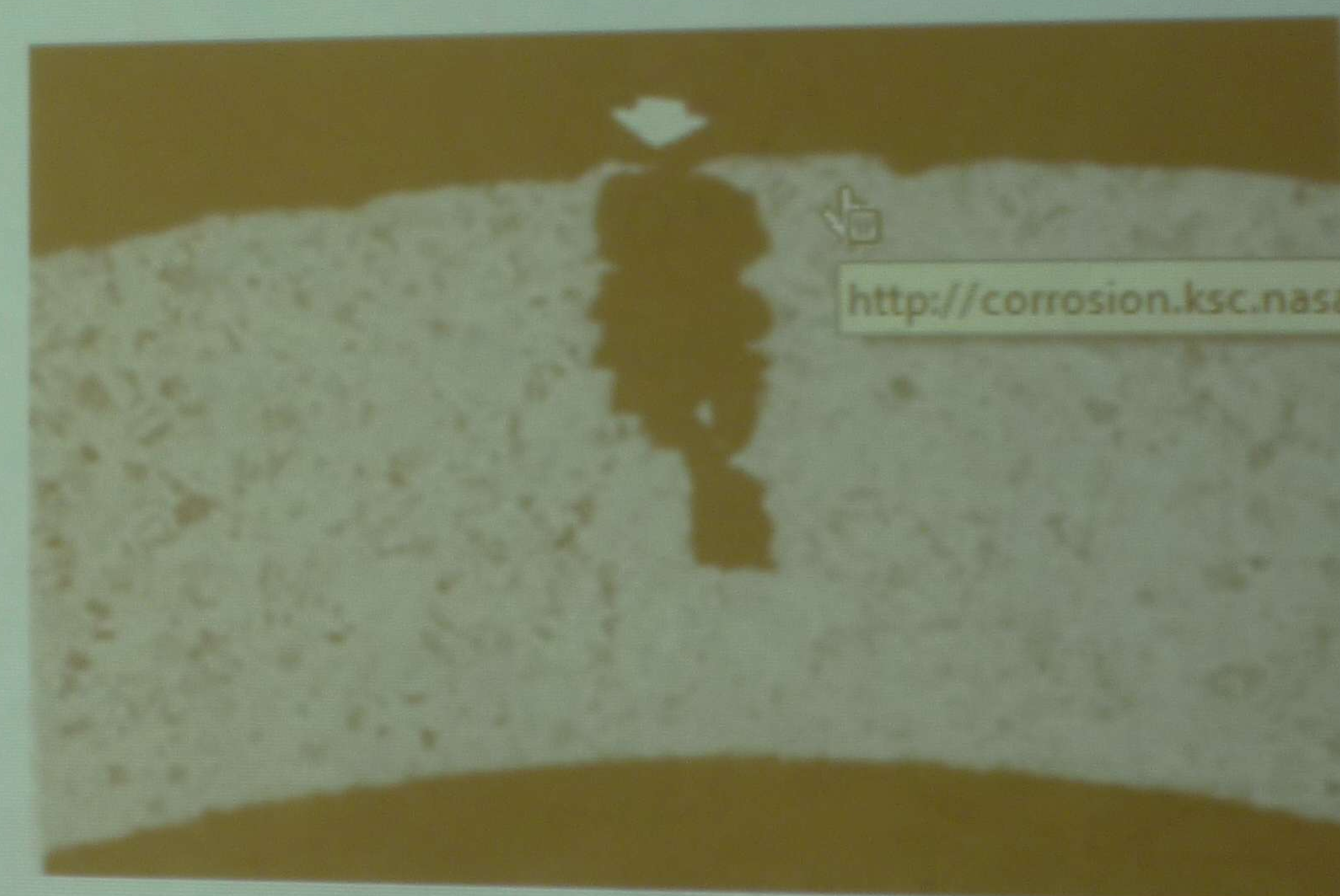
(Courtesy of www.ecl-ndt.com)

he rust bubbles or tubercules on the cast iron above indicate that pitting is occurring. Researchers ave found that the environment inside the rust bubbles is almost always higher in
wer in pH (more acidic) than the



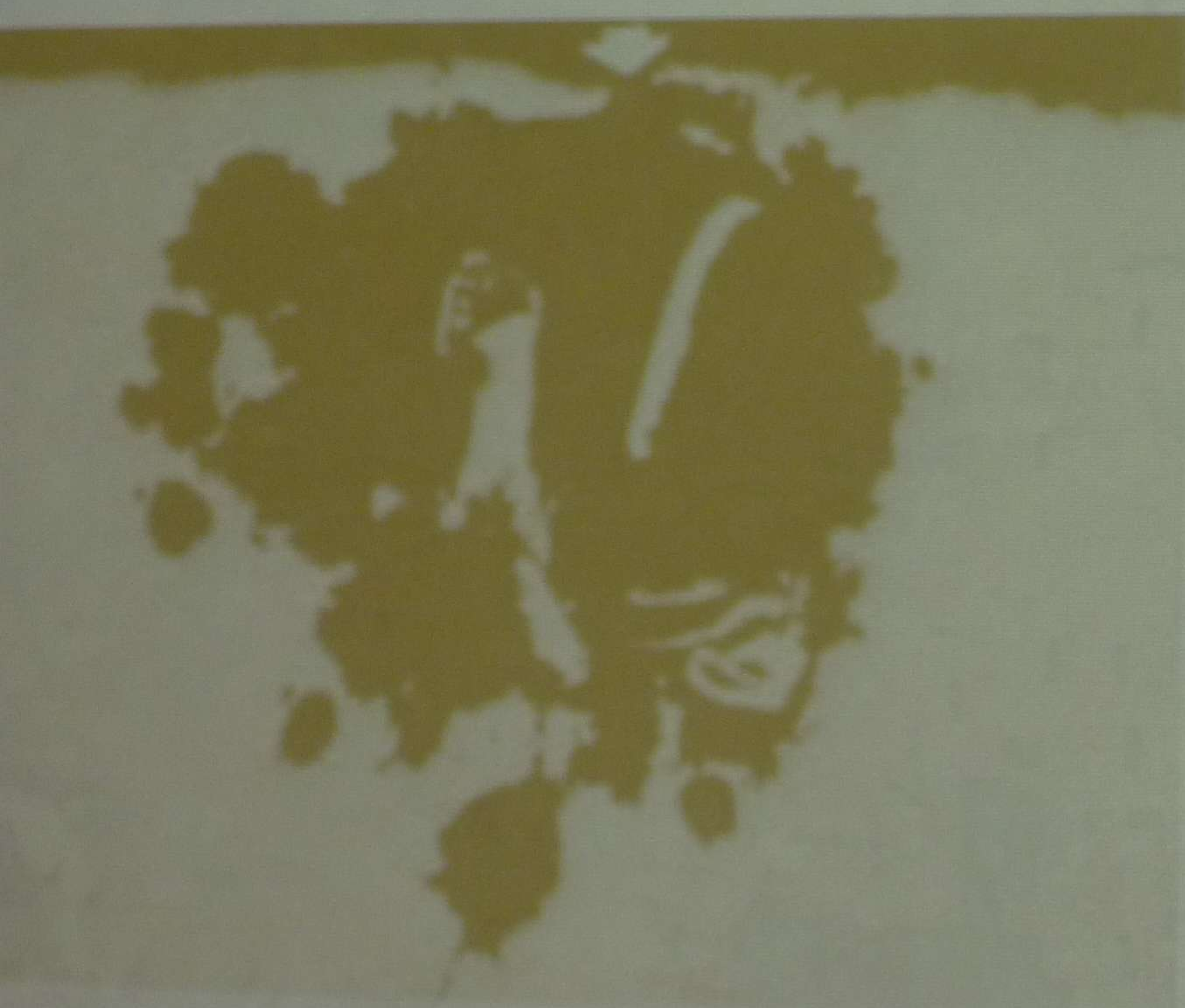
Similar changes in environment occur inside crevices, stress corrosion cracks, and corrosion fatigue cracks. All of these forms of corrosion are sometimes included in the term "occluded cell corrosion."

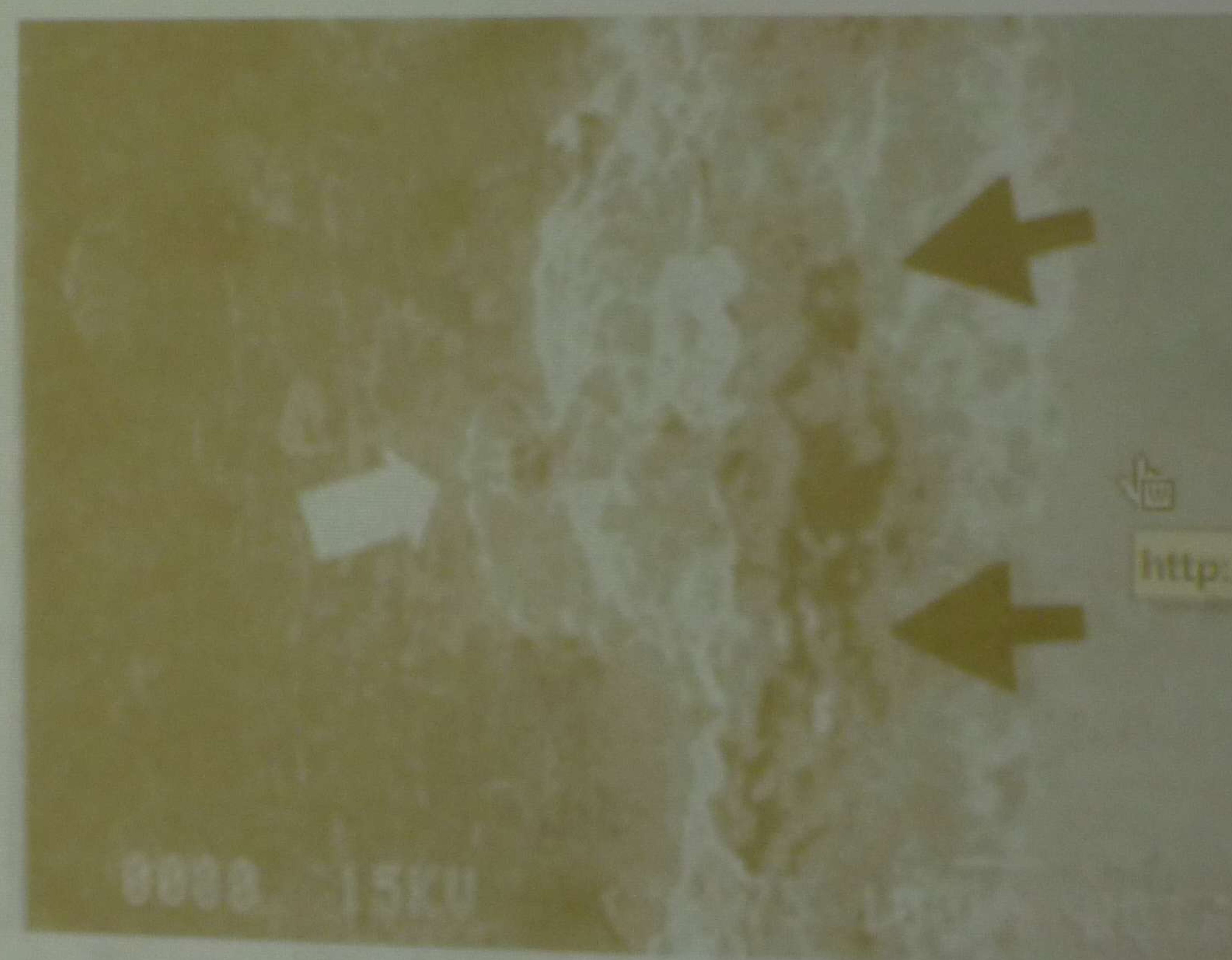




Pitting corrosion can lead to unexpected catastrophic system failure. The split tubing above left was caused by pitting corrosion of stainless steel. A typical pit on this tubing is shown above right.

Sometimes pitting corrosion can be quite small on the surface and very large below the surface. The figure below left shows this effect, which is common on stainless steels als. The pitting shown below right (white arrow) led to the stress corrosion fracture shown by the k arrows.





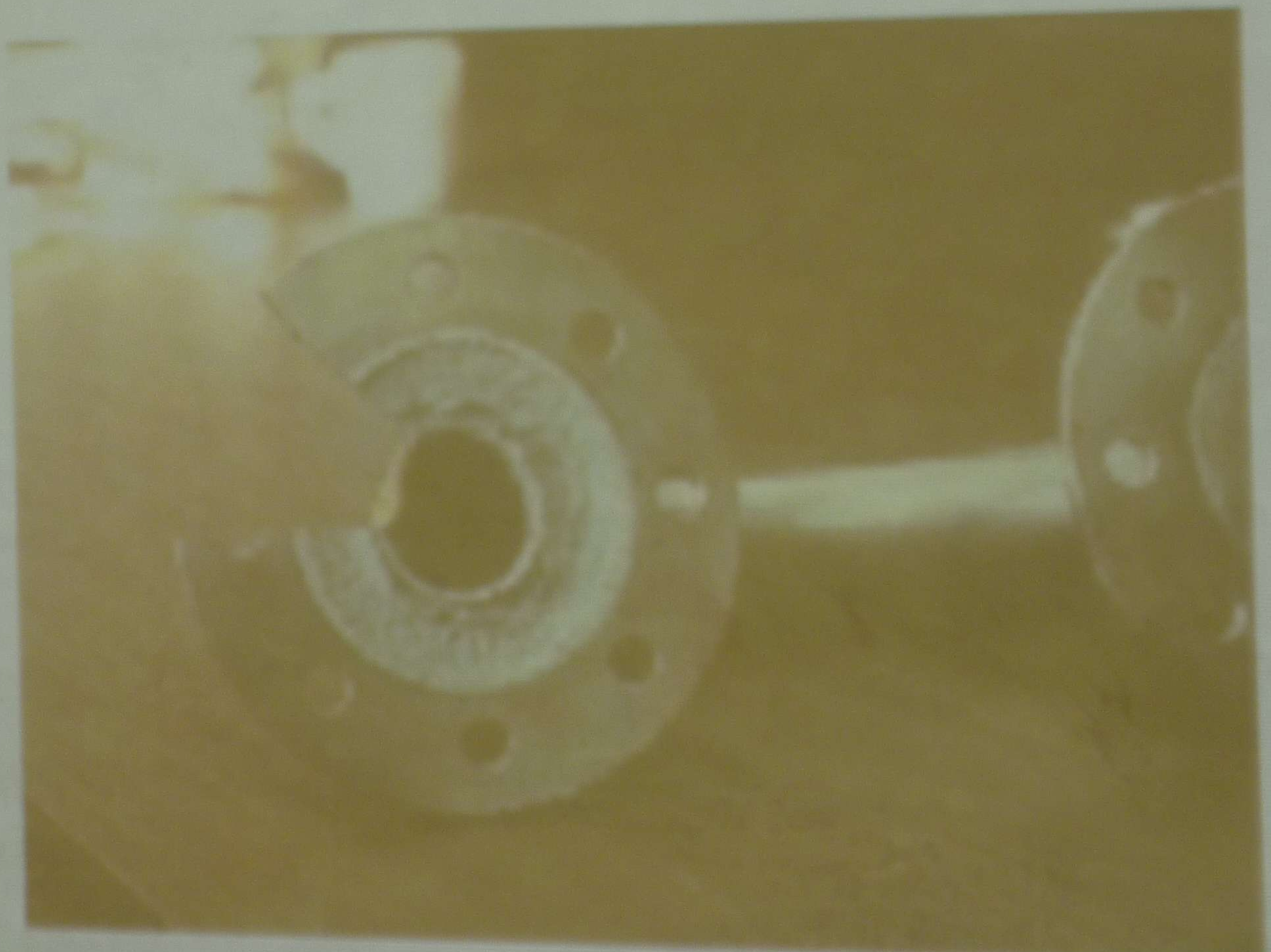
http://corrosion.ksc.n

nplete discussion of this corrosion is contained in Steven J. McDanels, "*Failure Analysis Of ch Pad Tubing From The Kennedy Space Center*," Microstructural Science, Vol. 25, 1998, ASM ational, Materials Park, OH, pp. 125-129.

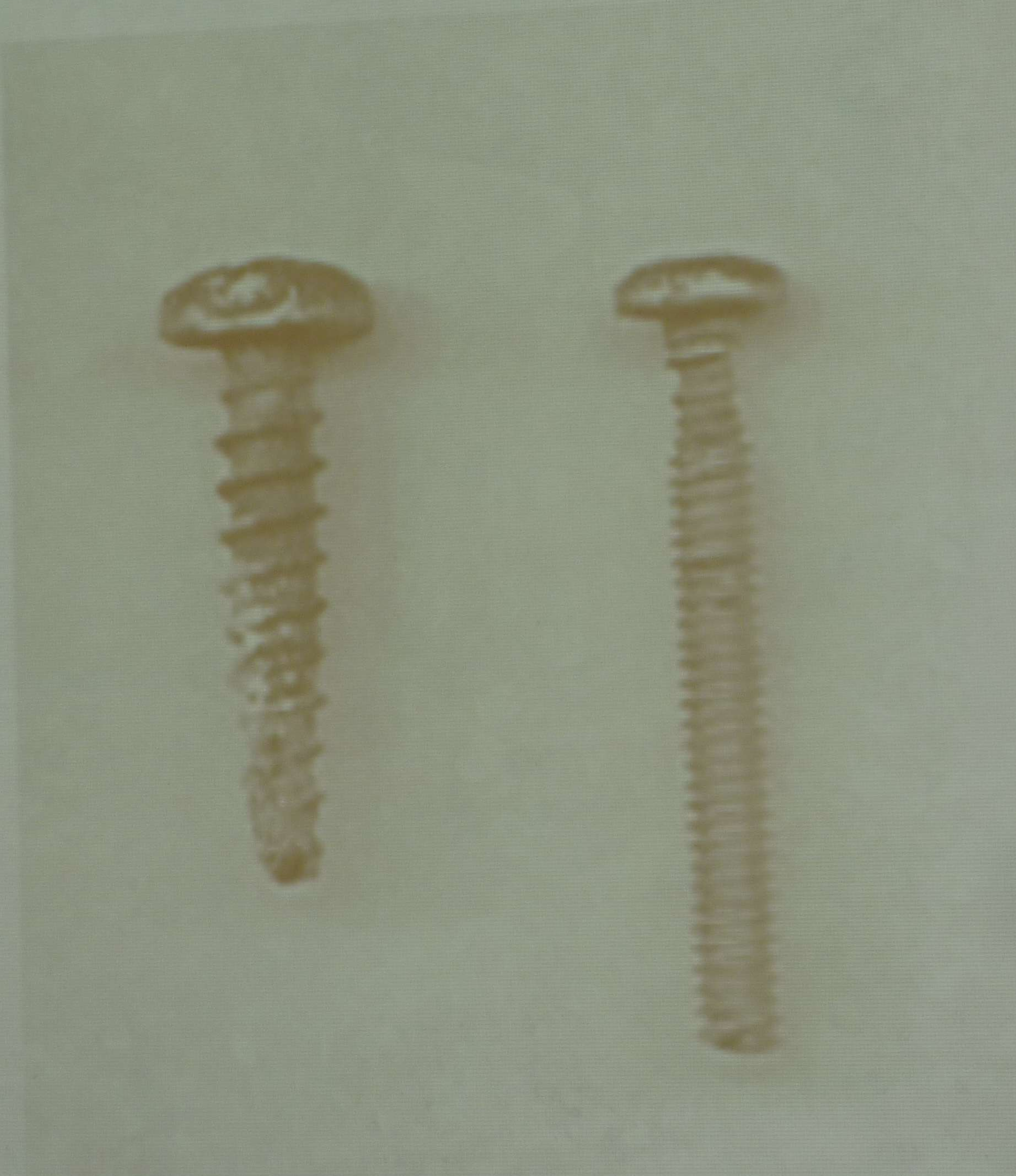
Crevice Corrosi

contact corrosion ... with nonmetals. It may occur at washers, under barnacles, ... films, and at pockets formed by threaded joints. Whether or not stainless steels are ... they are always susceptible to this kind of corrosion because a nucleus is not nece...

...s, the proper use of sealants, and protective coatings are effective means of contr... Molybdenum-containing grades of stainless steel (e.g. 316 and 316L) have increas... rrosion resistance.



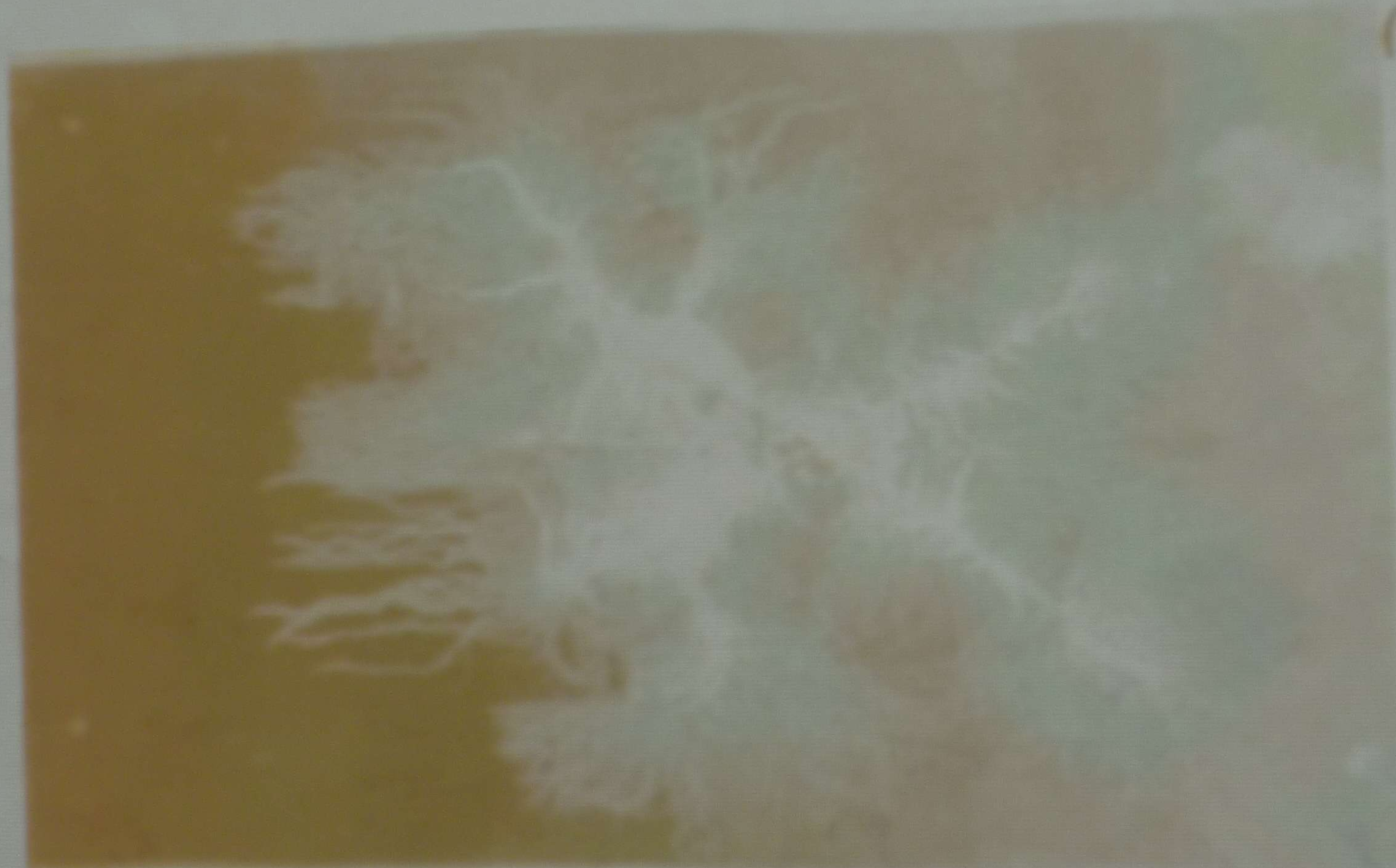
...ce corrosion shown above happened when an aerospace alloy ...



(Courtesy of marinesurvey.com)

nd "quick-dry" paints are most susceptible to the
ence of an adverse effect has been proven by field experience. Whe
should exhibit low water vapor transmission characteristics and exc
gs should also be considered for coating carbon steel because of the

(Courtesy of www.cp.uml



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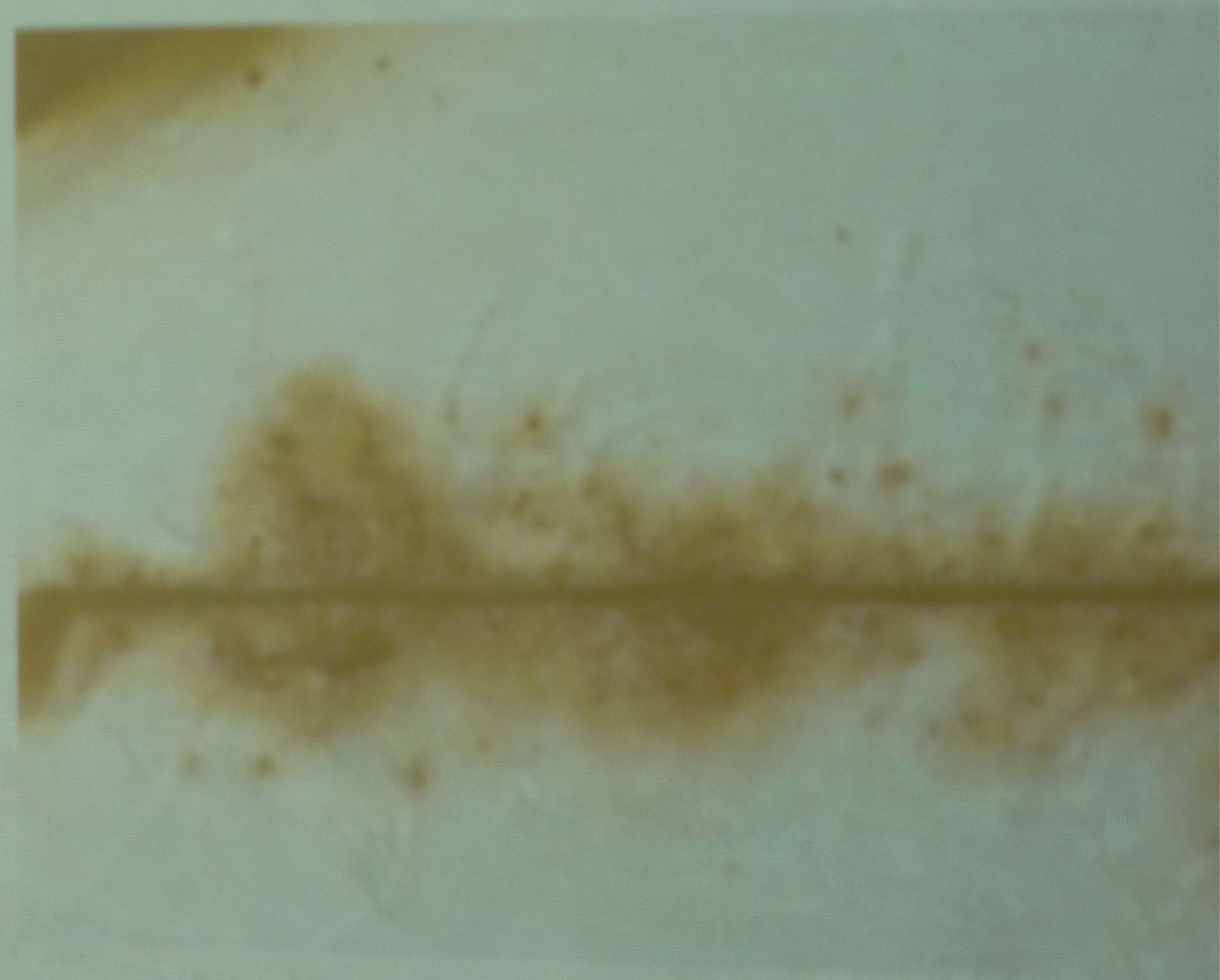
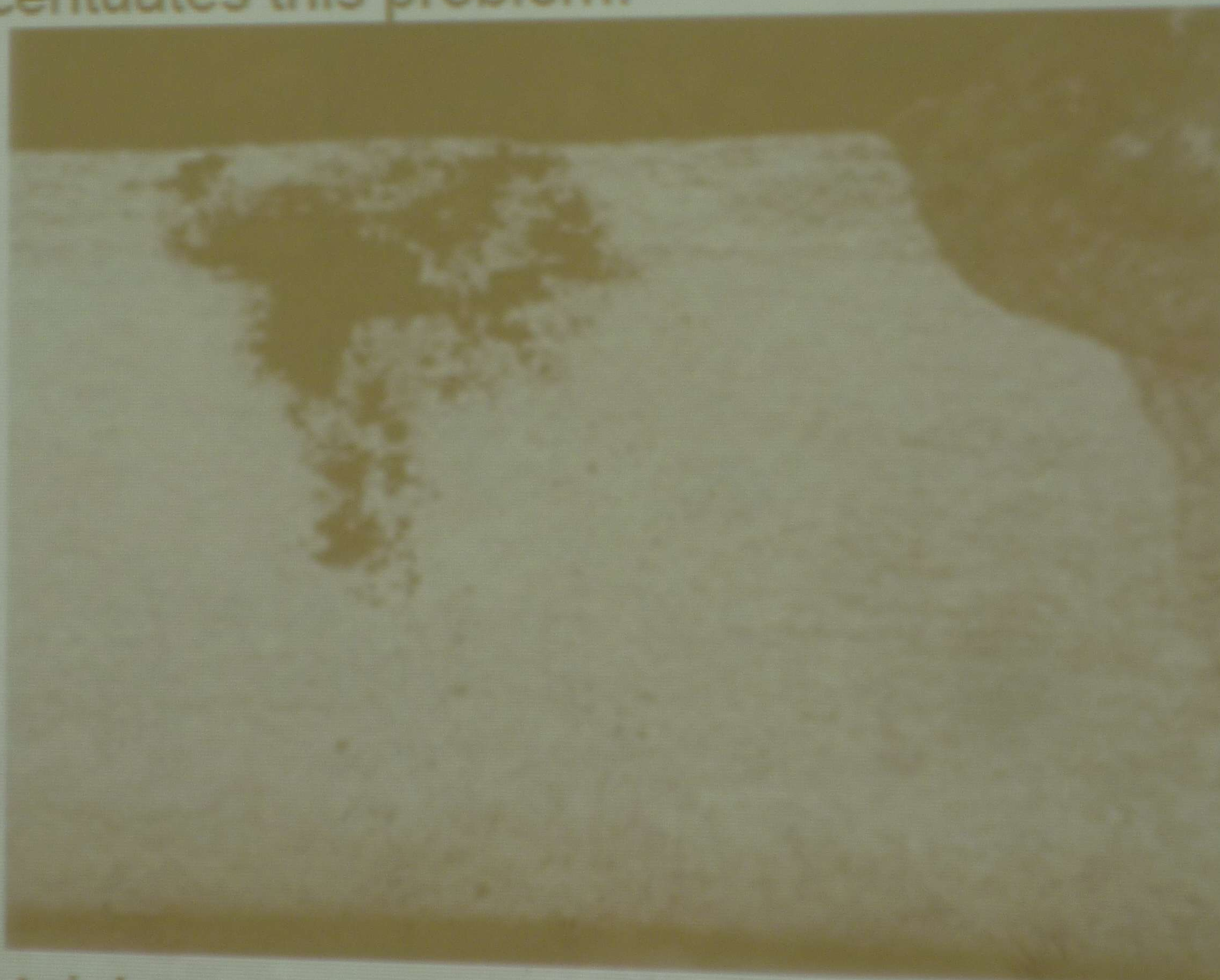
orrosion normally starts at small, sometimes microscopic, defects in

sion normally starts at small, sometimes microscopic, defects in the coating.



n the left shows filiform corrosion causing bleed-through on a welded tank. The p
hows "worm-like" filiform corrosion tunnels forming under a coating at the

s section of most commercial alloys will show its granular structure.
quantities of individual grains, and each of these tiny grains has a cle
ally differs from the metal within the grain center. Heat treatment of
alloys accentuates this problem.



shows a stainless steel which corroded in the heat affected zone a s
d. This is typical of intergranular corrosion in austenitic stainl

his is typical ... steels (321 or 347) or by using ...
ed by using stabilized stainless steels (321 or 347) or by using
r 3I6L).
um alloys (2000, 6000, and 7000 series alloys) can also have this pr
ation corrosion below.
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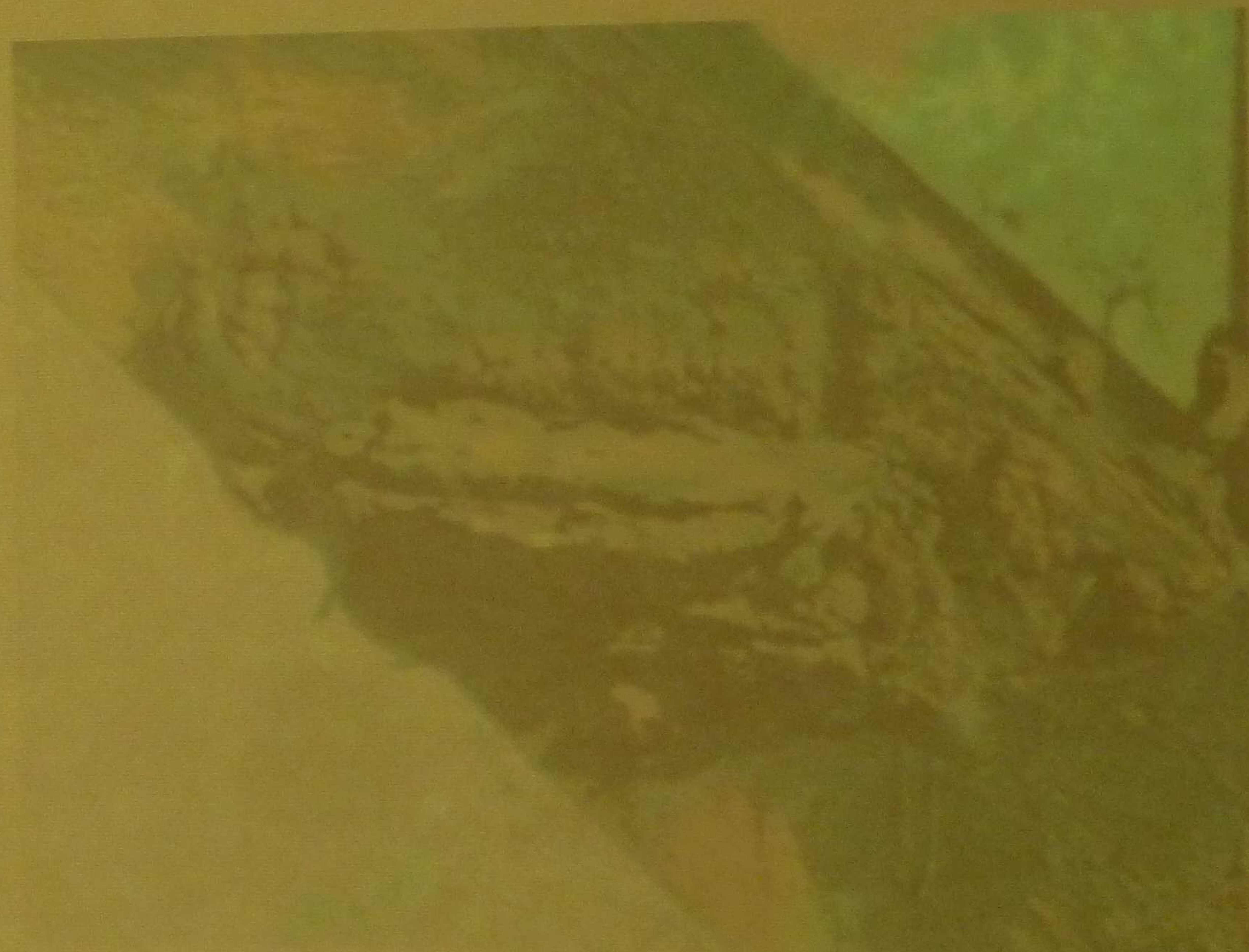
f intergranular corrosion. It manifests itself by lifting up the surface o



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Stress Corrosion Cracking

Beach Marks

Corrosion Fatigue of a Propeller