



*WebCorr Corrosion Consulting Services Presents*

# Corrosion in Microelectronics and Semiconductor Industry

Date: As published on website Venue: As published on website

## Course Overview

Corrosion is responsible for more than 50% of microelectronic device failures. It is dependent on the package type, electronic materials, fabrication and assembly processes, and environmental conditions (such as humidity, contaminants, temperature, stress and electrical bias etc.) This course thoroughly and systematically covers the causes and prevention of corrosion in microelectronics and semiconductor industry.

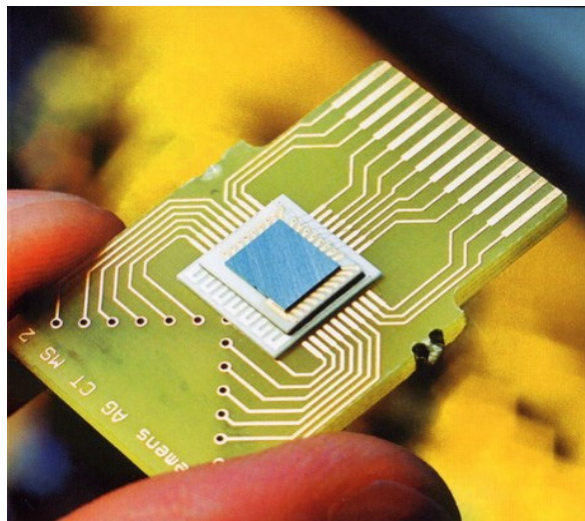
This 2-day corrosion short course can be taken as in-house training course, online course and distance learning course worldwide. It can also be customized to meet the specific needs of your organization.

## Who Should Attend

Engineers, designers, and QA/QC personnel working in the microelectronics and semiconductor industry.

## Course Outline

- 1 Fundamentals of Corrosion
  - 1.1 Definition and Examples of Corrosion
  - 1.2 Why Do Metals Corrode
  - 1.3 Basic Concepts in Corrosion
    - 1.3.1 Primer in Chemistry
    - 1.3.2 Ionization of Metals in Water
    - 1.3.3 Galvanic Cell and Galvanic Series
    - 1.3.4 the Corrosion Cell
    - 1.3.5 Potential-pH Diagram
  - 1.4 Different Forms of Corrosion
  - 1.5 Corrosion in Atmosphere
    - 1.5.1 Effect of Relative Humidity
    - 1.5.2 Effect of Temperature
    - 1.5.3 Effect of Air Pollutants
- 2 Corrosion in Microelectronics
  - 2.1 Characteristics of Corrosion in Microelectronics
    - 2.1.1 Properties of Electronic Materials
    - 2.1.2 Failure modes, defects, mechanisms, and causes
    - 2.1.3 Design and Packaging
    - 2.1.4 The Environment

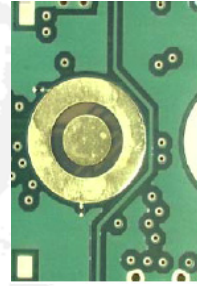


- 2.2 Common sources of corrosion in microelectronics
  - 2.2.1 Relative Humidity and Moisture
  - 2.2.2 Temperature
  - 2.2.3 Contaminants
  - 2.2.4 In-Process Sources
  - 2.2.5 Storage and shipping
  - 2.2.6 Human contamination
  - 2.2.7 In-service Contamination
  - 2.2.8 Electrical bias
- 2.3 Common forms of corrosion in microelectronics
  - 2.3.1 Anodic, Cathodic, and Electrolytic Reactions
  - 2.3.2 Uniform Corrosion
  - 2.3.3 Galvanic Corrosion
  - 2.3.4 Pitting Corrosion
  - 2.3.5 Creep Corrosion
  - 2.3.6 Dendrite Growth
  - 2.3.7 Fretting
  - 2.3.8 Stress Corrosion Cracking
  - 2.3.9 Hydrogen Embrittlement
  - 2.3.10 Whisker Growth
- 3 Corrosion in the Assembly of Semiconductor Integrated Circuits
  - 3.1 Major Factors Causing Corrosion
  - 3.2 Chip Corrosion
  - 3.3 Oxidation of Tin and Tin Lead Alloys (Solders)
  - 3.4 Mechanism of Tarnished Leads (Terminations)

### Course Outline

- 3.4.1 Tarnished Leads Caused by a Galvanic Corrosion
- 3.4.2 Tarnishing due to Chemical Residues
- 3.4.3 Tarnishing Caused by Base Metal Migration
- 3.4.4 Tarnishing by Plating Additives
- 3.5 Controlling Tarnished Leads at the Assembly
- 3.6 Plague and Plague-like Corrosion
  - 3.6.1 Purple Plague
  - 3.6.2 White Plague
  - 3.6.3 Red Plague
- 4 Corrosion in Semiconductor Wafer Fabrication
  - 4.1 Corrosion During Fabrication
    - 4.1.1 Metallization and Chlorine-Induced Corrosion
    - 4.1.2 Corrosion Prior to the Metal Lead Etch Process
    - 4.1.3 Corrosion Issues Related to Batch Metal-Etch Systems
    - 4.1.4 Corrosion Issues Related to Single-Wafer Metal-Etch Systems

- 4.1.5 Solvent Cleanup after Metal Etch
- 4.2 Corrosion Due to Environmental Effects
- 5 Corrosion Control and Prevention in Microelectronics
  - 5.1 Materials Selection in Microelectronics
  - 5.2 Design
  - 5.3 Use of Packaging Materials in Microelectronics
  - 5.4 Control of Environment in Microelectronics
- 6 Corrosion Test
  - 6.1 Accelerated Tests
  - 6.2 AC Impedance
  - 6.3 Galvanic Effect
  - 6.4 Corrosion Rate Determination
  - 6.5 Service Life Prediction
- 7. Exercises and Case Studies



### Course Registration

Please register online at [www.corrosionclinic.com](http://www.corrosionclinic.com)  
 Or use the form below (photocopies of this form may be used for multiple bookings).

Dr/Mr/Ms \_\_\_\_\_  
 Organization \_\_\_\_\_  
 Contact Person \_\_\_\_\_  
 Contact Dept \_\_\_\_\_  
 Telephone \_\_\_\_\_ Fax \_\_\_\_\_  
 Email \_\_\_\_\_

Payment should be made by TT or online banking. Currencies in Australian Dollar, Canadian Dollar, US Dollar, Euro and Sterling Pound can be transferred directly without conversion. Our bank details can be found at the link below:

<https://www.corrosionclinic.com/payment.html>

### Course Fee and Discount

**Standard:** \$4,950      **Discount:** \$4,455

The fee includes a hardcopy of course note, certificate, light lunch, coffee breaks each day during the course.

Discount applies to a group of 3 or more persons from the same organization registering at the same time, or early-birds making payment at least 8 weeks before the course commencing date.

### Cancellation and Refunds

Cancellation or replacement should be conveyed to WebCorr in writing (email or fax). An administration charge of 50% of the course fee will be levied if the cancellation notice is received from 14 to 7 days before the course commencing date. No refund will be made for cancellation notice received 6 days and less. No refunds will be given for no-shows. Should WebCorr find it necessary to cancel a course, paid registrants will receive full refund. Refund of fees is the full extent of WebCorr's liability in these circumstances.



