

Selected Publications on Multielectrode Array Sensors for Corrosion Monitoring

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1. Kuang-Tsan Kenneth Chiang, Lietai Yang, "Aluminum and Nickel Alloy Multielectrode Sensors for Corrosion Monitoring at High Temperatures," CORROSION/2009, paper no. 09440 (Houston, TX: NACE International, 2009).
2. L. Yang and K.T. Chiang, "A Review of Coupled Multielectrode Array Sensors for corrosion Monitoring and a Study on the Behaviors of the Anodic and Cathodic Electrodes," To be published by Journal of ASTM International, March, 2009.
3. L. Yang, K.-T. Chiang, P.K. Shukla, and N. Shiratori, "Internal Current Effects on Corrosion Rate Measurements Using Coupled Multielectrode Array Sensors," CORROSION/2009, paper no. 09446 (Houston, TX: NACE International, 2009).
4. Dan Duke and L. Yang, "Localized and General Corrosion of Copper in Azoles and Silica Inhibited Zero Blowdown Cooling Water in an Automotive Plant," CORROSION/2009, paper no. 09444 (Houston, TX: NACE International, 2009).
5. Takao Otsu, Mitsubishi Chemical Corporation; Masazumi Miyazawa, "Application of Analysis and Control for Corrosion Damage In Cooling Water Systems Using Corrosion Monitoring," CORROSION/2009, paper no.09439 (Houston, TX: NACE International, 2009).

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1. Raymond Colbert, Dr Ronald Reich "Corrosion Monitoring of a Water Based Rolling Facility with Coupled Multielectrode Array Sensors and the Correlations with Other Process Variables: Conductivity, pH, Temperature, Dissolved Oxygen and Corrosion Potential", CORROSION/2008, paper 08295, (Houston, TX: NACE, 2008).
2. Dan Duke and L. Yang, "Electrochemical Studies with CMAS Probes on Corrosion Inhibition of Copper and Affected Metals in the Presence of Ammonia and Other Corrosive Ions in Zero Liquid Discharge Cooling Water" CORROSION/2008, paper 08372, (Houston, TX: NACE, 2008).
3. Lietai Yang and Xiaodong Sun, "A Method to Reduce The Internal Current Effect On Localized Corrosion Measurements With Coupled Multielectrode Array Sensors" CORROSION/2008, paper 08395, (Houston, TX: NACE, 2008).
4. Kuang-Tsan Kenneth Chiang, Dr. Boffardi Bennett , "A Coupled Multielectrode Array Sensor for Corrosion Monitoring at High Temperatures", CORROSION/2008, paper 08607, (Houston, TX: NACE, 2008).
5. X. Sun, "Corrosion monitoring under cathodic protection conditions using coupled multielectrode probe techniques", in "Techniques for Corrosion Monitoring" , Lietai Yang ed, Chapter 26, Cambridge, United Kingdom, Woodhead Publishing, 2008.
6. L. Yang, "Multielectrode Systems", in "Techniques for Corrosion Monitoring" , Lietai Yang ed, Chapter 10, Cambridge, United Kingdom, Woodhead Publishing, 2008.
7. Nobuo Shiratori, N. Sridhar, Lietai Yang and D. Dunn, "Effect of Electrode Number and Size on Corrosion Rate Obtained from Coupled Multielectrode Array Sensor System," Proceedings of the 17th international Corrosion Congress, Paper #3823, (Houston, TX: NACE, 2008).
8. J. Hu, O. Sari, F. Brun, E. Sara, J. Forchelet, J. Bettex, and P. Homsy, "Online and Real-Time Monitoring of Corrosion Rate of Stainless Steel, Low Carbon Steel and Copper in CO₂ Hydrate Slurry with Coupled Multielectrode Array Sensors," Proceedings of the 17th international Corrosion Congress, Paper #3129, (Houston, TX: NACE, 2008).
9. L. Yang and K.T. Chiang, "Electrochemical Behavior and Internal Current of the Most Anodic Electrode in a Coupled Multielectrode Array Sensor," Proceedings of the 17th international Corrosion Congress, Paper#3145, (Houston, TX: NACE, 2008).
10. B. Yang, A. V. Gershun, and P. M. Woyciesjes, "Controlled Atmosphere Brazing of Aluminum Heat Exchangers and Effects of Flux Residues on Corrosion of the Cooling System Components in Engine Coolants," Proceedings of the 17th international Corrosion Congress, Paper #3787, (Houston, TX: NACE, 2008).
11. Xiaodong Sun Yang, "Improved electronic system for multielectrode sensors and electrochemical devices", US Patent, #7,466149 (United States Patent and Trademark Office, 2008).

12. K.T. Chiang, L. Yang, R. Wei, and K. Coulter, "Development of diamond-like carbon-coated electrodes for corrosion sensor applications at high temperatures," *Thin Solid Films*, 517, pp.1120–1124 (2008).
13. K.T. Chiang and L. Yang, "Development of Crevice-Free Electrodes for Multielectrode Array Sensors for Applications at High Temperatures," *Corrosion*, 64, pp.805–812 (2008).

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1. "Coupled Multielectrode Array Systems and Sensors" in "Corrosion Inspection and Monitoring", Pierre R. Roberge, Section 4.3.3.3.3, Hoboken, NJ: John Wiley & Sons, Inc, pp.207-209, 2007.
2. "Electronic system for multielectrode sensors and electrochemical devices", Xiaodong Sun Yang, US Patent, #7,180,309 (United States Patent and Trademark Office, 2007).
3. "Multielectrode Penetration Sensor for Monitoring Localized and General Corrosion", Xiaodong Sun and Lietai Yang, *CORROSION/2007*, paper no. 07391 (Houston, TX: NACE, 2006).
4. "Measurement of Cumulative Localized Corrosion Rate Using Coupled Multielectrode Array Sensors," Lietai Yang and Xiaodong Sun, *CORROSION/2007*, paper no. 07378 (Houston, TX: NACE, 2007).
5. "Development of Crevice-Free Multielectrode Sensors for Elevated Temperature Applications", Kuang-Tsan Kenneth Chiang and Lietai Yang, *CORROSION/2007*, paper no. 07376 (Houston, TX: NACE, 2007).
6. "Laboratory and Field Studies of Localized and General Corrosion Inhibiting Behaviors of Silica in Zero Liquid Discharge (High TDS Cooling Water) using Real Time Corrosion Monitoring Techniques" Dan Duke, Lietai Yang, *CORROSION/2007*, paper no. 07626 (Houston, TX: NACE, 2007).
7. "Effect of Fluoride on Corrosion of Cooling System Metals in Ethylene Glycol-Based Antifreeze/Coolants", Bo Yang, Aleksei V. Gershun, Filipe J. Marinho, and Peter M. Woyciesjes, *Journal of ASTM International*, Vol. 3, No. 10, Paper ID JAI100605.
8. "New Electrochemical Methods for the Evaluation of Localized Corrosion in Engine Coolants," B. Yang, F.J., Marinho, A.V. Gershun, *Journal of ASTM*, Volume 4, Issue 1 (2007),
9. T. Pickthall, V. Morris, and H. Gonzalez, "Corrosion Monitoring of a Crude Oil Pipeline A Comparison of Multiple Methods," *CORROSION/07*, paper no. 07340, Houston, TX: NACE, 2007.
10. "Correlation of In-Situ VCI Adsorption Monitoring with Real-Time Corrosion Rate Measurements", Garth Tormoen, James Dante, and Narasi Sridhar, *CORROSION/2007*, paper no. 07356, Houston, TX: NACE, 2007.
11. "Method for measuring localized corrosion rate with a multi-electrode array sensor", Lietai Yang, US Patent, #7,309,414 (United States Patent and Trademark Office, 2007).

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1. "Coupled Multielectrode Array Systems And Sensors for Real-Time Corrosion Monitoring - A Review", L. Yang and N. Sridhar, *CORROSION/2006*, paper no. 06681 (Houston, TX: NACE, 2006).
2. "Real-time Measurement of Crevice Corrosion with Coupled Multielectrode Array Sensors", X. Sun and L. Yang, *CORROSION/2006*, paper no. 06679 (Houston, TX: NACE, 2006).
3. "Real-Time Monitoring of Localized and General Corrosion Rates in Simulated Marine Environments Using Coupled Multielectrode Array Sensors", X. Sun and L. Yang, *CORROSION/2006*, paper no. 06284 (Houston, TX: NACE, 2006).
4. "Real-Time Monitoring of Localized and General Corrosion Rates in Drinking Water Utilizing Coupled Multielectrode Array Sensors", X. Sun and L. Yang, *CORROSION/2006*, paper no. 06094 (Houston, TX: NACE, 2006).
5. "Monitoring Corrosion Behavior of a Cu-Cr-Nb Alloy by Multielectrode Sensors", K. Chiang and L. Yang, *CORROSION/2006*, paper no. 06676 (Houston, TX: NACE, 2006).
6. "Application of Multielectrode Array to Study Dewpoint Corrosion in High Pressure Natural Gas Pipeline Environments", N. Sridhar, L. Yang and F. Song, *CORROSION/2006*, paper no. 06673 (Houston, TX: NACE, 2006).

7. "Use of the Multiple-Array-Sensor to Determine the Effect of Environmental Parameters on Microbial Activity and Corrosion Rates". P. Angell, CORROSION/2006, paper no. 06671 (Houston, TX: NACE, 2006).
8. "Sensor Array and Method for Electrochemical Corrosion Monitoring," Lietai Yang and Narasi Sridhar, U.S. Patent No. 6,987,396 (2006).

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- 2 "Online Monitoring of Undercoating Corrosion Using Coupled Multielectrode Sensors", X. Sun, Materials Performance, 44(3), March (2005), pp. 28-32.
- 3 "Online and Real-Time Monitoring of Carbon Steel Corrosion in Concrete, Using Coupled Multielectrode Sensors," X. Sun, CORROSION/2005, paper no. 05267 (Houston, TX: NACE International, 2005).
- 4 "Real-Time Corrosion Monitoring in Soil with Coupled Multielectrode Sensors," X. Sun, CORROSION/2005, paper no. 05381 (Houston, TX: NACE International, 2005).
- 5 "Laboratory Evaluation of a Multi-Array Sensor for Detection of Under Deposit Corrosion and/or Microbiologically Influenced Corrosion", M. H. Dorsey, D.R. Demarco, G. A. Fisher, and B. J. Saldanha, CORROSION/2005, paper no. 05371 (Houston, TX: NACE International, 2005).
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- 2 "What's New in the Water Industry?", by Arthur J. Freedman, Materials Performance, May (2004): p.8.
- 3 "Online Monitoring of Undercoating Corrosions Utilizing Coupled Multielectrode Sensors", by X. Sun, CORROSION/2004, paper no. 04033, (Houston, TX: NACE International, 2004).
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- 2 “Coupled Multielectrode Online Corrosion Sensor”, L. Yang and N. Sridhar, Materials Performance, 42(9) September (2003): p.48-52.
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- 8 “An Electrochemical Approach to Predicting and Monitoring Localized Corrosion in Chemical Process Streams”, by A. Anderko, N. Sridhar, C. S. Brossia, D. S. Dunn, L.T. Yang, B.J. Saldanha, S.L. Grise, and M.H. Dorsey, CORROSION/2003, paper no. 03375, (Houston, TX: NACE International, 2003).

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