

Simonida Grubjesic, Ph.D.

Senior Scientist & Group Director, Analytical Chemistry

Dr. Simonida Grubjesic is Senior Consultant and Laboratory Manager. Her responsibilities include technical consulting and materials laboratory testing. Dr. Grubjesic's professional practice focuses on forensic failure investigation of construction materials, corrosion-related material failures, and solving materials-related challenges for clients coming from diverse markets.

Dr. Grubjesic's extensive industry experience includes laboratory management, materials development, and characterization with applications in multiple industries including construction, paints and coatings, elastomers, composite and functional materials and nanotechnology. Her specialty lies in materials characterization, surface, and corrosion science. Dr. Grubjesic brings a strong proficiency in corrosion science, accelerated weathering testing, accelerated corrosion testing such as Electrochemical Impedance Spectroscopy (EIS), and variety of other materials testing technique such as XRF, XRD, SEM, FTIR AFM, XPS, TEM, optical microscopy, and wet chemistry techniques.

Prior to joining CTLGroup, Dr. Grubjesic worked at a major chemical additive manufacturing firm where she was part of the R&D materials and corrosion department leading multiple projects involving development of organic and inorganic anti-corrosion pigment additives for industrial and architectural paints and coatings market. Dr. Grubjesic has worked on projects related to corrosion protection on metal surfaces, managed accelerated corrosion, weathering and laboratory electrochemical impedance testing. She has expertise in raw materials production, process optimization and troubleshooting as well as regulatory and commercial aspects of raw material manufacturing.

Dr. Grubjesic has spent number of years in governmental research facility designing and studying smart functional materials with emergent behaviors to solve energy conversion and storage challenges as directed by US Department of Energy. She has also worked on broad range of topics including nanotechnology and functional materials.

Representative Project Experience

Metal Corrosion

- Technical Expert responsible for testing and identifying the causes for observed corrosion of reinforcing steel bars and railing along balconies of a condominium building, as well as the delamination, spalling, and cracking of post pocket grout and balcony concrete surrounding the aluminum railing.
- Technical Expert in charge of investigating defects related to corrosion-related paint failure on aluminum railings at a high-rise condominium building in metropolitan area. Field investigation and sample collection at various units in the



Academic Credentials

Ph.D. Organic Chemistry
University of Illinois at Chicago,
2004

B.S. in Chemistry
University of Novi Sad-Serbia,
1997

Professional Affiliations

ASTM International

American Chemical Society (ACS)

Society for Protective Coatings
(SSPC)

American Concrete Institute (ACI)

Chicago Society for Coatings
Technology (CSCT)

Contact Information

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building produced failure specimens, which were brought to CTLGroup for material testing to ascertain the cause of the paint failure.

- Technical Expert in evaluation FBE metal pipe coating failures during prolonged yard storage and weathering exposure at location in Texas. Forensic investigation included metal component metallurgical investigation and paint evaluation.
- As the Technical Expert, Dr. Grubjesic was responsible for managing and conducting chemical testing on observed corrosion of aluminum cladding materials and railings along balconies of a condominium building. A combination of Microscopy, X-ray, and Fourier Transform Infrared Analyses was conducted to determine the cause of corrosion.
- Managed various projects concerning corrosion-related failures on metal components. Utilizing optical microscopy, SEM, XRD, XRF and FTIR.
- Managed quality control testing for anti-corrosive raw materials production and metal components in aerospace industry.
- Headed development of new product designed to prevent corrosion of metal in construction, including exterior metal components and rebar using chemical inhibitors.

Construction Materials Failure

- Evaluated construction materials samples using multiple analytical techniques to determine cause of deterioration. Components evaluated include grouts, mortars, concrete, ready mix and precast concrete, residential and commercial floors, parking garages, stucco facades, sealants and paints, roofing materials, fireproofing coating materials, tennis court surfaces, and swimming pool plasters.

Laboratory Management

- Managed laboratory operations for corrosion and weathering testing, materials testing and characterization.
- Directed laboratory testing of cementitious materials such as cement, fly ash, slag, concrete, and other components related to construction materials as well as polymer, elastomers, CASE materials, organic materials and composites. Testing includes chemical, physical, microscopy, and analytical chemistry techniques, including organic and inorganic analytical techniques.
- Directed and implemented laboratory management systems and quality control programs for numerous test methods in corrosion and weathering, materials testing and construction industry.
- Research and problem-solving analyses for a wide variety of materials, including metals, minerals, building products and materials, polymers and polymer composites, elastomers, smart new materials

Paints & Coatings Investigation

- Technical Expert in charge of investigating construction defects related to paint failure on aluminum railings at a high-rise condominium building in metropolitan area. Observations and sample collection of flaking/delaminated paint were made

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at various units in the building, which were brought to CTLGroup for material testing to ascertain the cause of the paint failure.

- Technical Expert responsible for testing and identifying the causes for observed corrosion of reinforcing steel bars and railing along balconies of a condominium building, as well as the delamination, spalling, and cracking of post pocket grout and balcony concrete surrounding the aluminum railing.
- As the Technical Expert, Dr. Grubjesic was responsible for conducting chemical testing on observed corrosion of aluminum cladding materials and railings along balconies of a condominium building. A combination of Microscopy, X-ray, and Fourier Transform Infrared Analyses was conducted to determine the cause of corrosion.
- Dr. Grubjesic was in charge of investigating the paint cracking observed on the outside concrete benches located in California. Paint and concrete samples were sent to CTLGroup for material testing to determine the cause of the paint failure. Material evaluation using Microscopy and Fourier Transform Infrared Analyses was performed during the investigation.
- As the Technical Expert, Dr. Grubjesic was in charge of investigating the premature failure of a multi component traffic membrane located in Canada. The Fourier Transform Infrared Analyses was conducted to determine the possible cause of membrane failure.

Nuclear Industry

- Managed multiple projects for the Nuclear Industry. Projects involved qualifying constituents for concrete production using multiple analytical chemistry techniques and physical testing.

Publications

- Tiu, B.D.B.; Grubjesic, S. et al. Improved Corrosion Protection Due to Organic Corrosion Inhibitors in Waterborne Paint Coatings, *J. Coatings Tech*, August 2016.
- Grubjesic, S.; Tarjan, D.; Toussaint, A. Zinc-free Protection in Waterborne Coatings, *Welt der Farben*, 2016.
- Grubjesic, S.; Lee, B.; Seifert, S.; Firestone, M.A. Preparation of self-supporting cell architecture mimic by water channel confined photocrosslinking within a lamellar structural hydrogel. *Soft Matter*, 7, 9695-9705, 2011.
- Edelstein, A.; Fink, D.; Musch, M.; Valuckaite, V.; Zaborina, O.; Grubjesic, S.; Firestone M. A.; Matthews, J. B.; John, C.; Alverdy, J. A. Protective effects of nonionic tri-block copolymers on bile acid mediated epithelial barrier disruption, *Shock*, 36, 451-457, 2011.
- Grubjesic, S.; Firestone, M.A. Cytoskeleton-mimetic reinforcement of self-assembled N,N'-dialylimidazolium ionic liquid monomer by copolymerization. *Macromolecules*, 42, No.15, 5461-5470, 2009.
- Green, O.; Grubjesic S.; Lee, S.; Firestone, M.A. The Design of Polymeric Ionic

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Liquids for the Preparation of Functional Materials, *Polymer Reviews*, 49, 339–360, 2009.

- Moriarty, R.M.; Grubjesic, S.; Surve, B. C; Chandrasekera, S.N.; Prakash, O.; Naithani, R. Synthesis of Abyssinone II and related compounds as potential chemopreventive agents. *European, Journal of Medicinal Chemistry*, 41, 263-267, 2006.
- Grubjesic, S.; Dalsin, J.L.; Fang, F.; Szleifer, I.; Messersmith, P.B. Adsorption of non-fouling polymers functionalized with mussel adhesive protein mimetic peptides: computational predictions and experimental observations. *Polymer Preprints*, 46, No.1, 116-117, 2005.
- Li, Y.; Grubjesic, S.; Nikolic, D.; Kosmeder, J. W. Moriarty, R.M.; Pezzuto, J. M.; van Breemen, R.B. In vitro assessment of intestinal permeability and hepatic metabolism of 4'-bromoflavone, a promising cancer chemopreventive agent. *Xenobiotica*, 34, No. 6, 535-47, 2004.
- Nikolic, D.; Li, Y.; Chadwick, L. R.; Grubjesic, S.; Schwab, P.; Metz, P.; van Breemen, R. B. Metabolism of 8-prenylnaringenin, a potent phytoestrogen from hops (*Humulus lupulus*), by human liver microsomes. *Drug Metabolism and Disposition*, 32, 272-279, 2004.
- Grubjesic, S.; Moriarty, R. M.; Pezzuto, J. M. Aromatase inhibitors. *Expert Opinion on Therapeutic Patents*, 12, 1647-1661, 2002. Review

Books

- Pezzuto, J.M.; Kosmeder II, J.W.; Park, E.J.; Lee, S.K.; Cuendet, M.; Gills, J.; Bhat, K.; Grubjesic, S.; Park, H.-S.; Mata-Greenwood, E.; Tan, Y.M.; Yu, R., Lantvit, D.D.; Kinghorn, A.D. Characterization of Natural Product Chemopreventive Agents. *Cancer Chemoprevention*, 3-37, 2005.

Presentations

- Grubjesic, S. Materials Testing Used in Coatings Failure Investigations, CP 2018 Industry Technical Seminar, Minnetonka, Minnesota, 2018.
- Grubjesic, S. Analytical Laboratory Techniques Used in Coatings Investigations, CP 2018 Industry Technical Seminar, Elk Grove, Illinois 2017.
- Grubjesic, S. Inorganic and Organic Corrosion Inhibitors for High Performance Coatings, CH Erbsloh Coatings Conference, Moscow, Russia, 2016.
- Grubjesic, S. Striving for Optimal Corrosion Resistance in Waterborne Paint Systems. Western Coatings Show, Las Vegas, NV, 2015.
- Grubjesic, S., Firestone, M.A. Polymeric Nanostructured Hydrogels as Biomembrane Patches, 280-2, Pittcon, Chicago, IL, 2009.
- Grubjesic, S., Firestone, M.A. Ionic Liquid-Derived Nanostructured Polymers As Membrane Protein Scaffolds, Postdoctoral Research Symposium, Argonne National Laboratory, Argonne, IL, 2008.

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- Grubjesic, S.; Dalsin, J. L.; Messersmith, P. B. Synthesis of catecholic amphiphiles for TiO₂ surface modification. 231st ACS National Meeting, Atlanta, GA, 2006.
- Fan, X.; Sherman, D.; Grubjesic, S.; Lee, H.; Messersmith, P. Block Copolymer Brush-Ag Hybrid Thin Films by Surface-Initiated Polymerization for Antimicrobial and Antifouling Surfaces, MRS SpringMeeting, San Francisco, CA, 2006.
- Grubjesic, S.; Dalsin, J. L.; Fang, F.; Szleifer, I.; Messersmith, P. B. Adsorption of non-fouling polymers functionalized with mussel adhesive protein mimetic peptides: computational predictions and experimental observations. POLY-233, 229th ACS National Meeting, San Diego, CA, 2005.
- Grubjesic, S.; Li, Y.; Kosmeder, J. W.; van Breemen, R. B.; Pezzuto, J. M.; Moriarty, R. M. Synthesis and structure verification of 4'bromoflavone metabolites. MEDI 355, 226th ACS National Meeting, New York, NY, 2003.
- Grubjesic, S.; Park, H.; Kosmeder, J. W.; Pezzuto, J. M.; Moriarty, R. M. Synthesis of prenylated flavonoids and their activity in aromatase assay. MEDI 107, 225th ACS National Meeting, New Orleans, LA, 2003.

Prior Experience

ICL/Advanced Additives/ICL Performance Products, Hammond, Indiana

Research Specialist, R&D/Marketing and Technical Services Department, 2014 - 2017

Benedictine University, Lisle, Illinois

Lecturer-Organic Chemistry, 2014

Argonne National Laboratory, Lemont, Illinois

Research Chemist, Materials Science Division, 2009 - 2013

Post-Doctoral Fellow, Materials Science Division, 2007 - 2009

Northwestern University, Evanston, Illinois

Post-Doctoral Fellow, Biomedical Engineering, Biomaterials Group, 2004 - 2007

University of Illinois at Chicago, Chicago, Illinois

Research Assistant, Chemistry Department, 1999 - 2004

Intern, Chemistry Department, summer 1996