



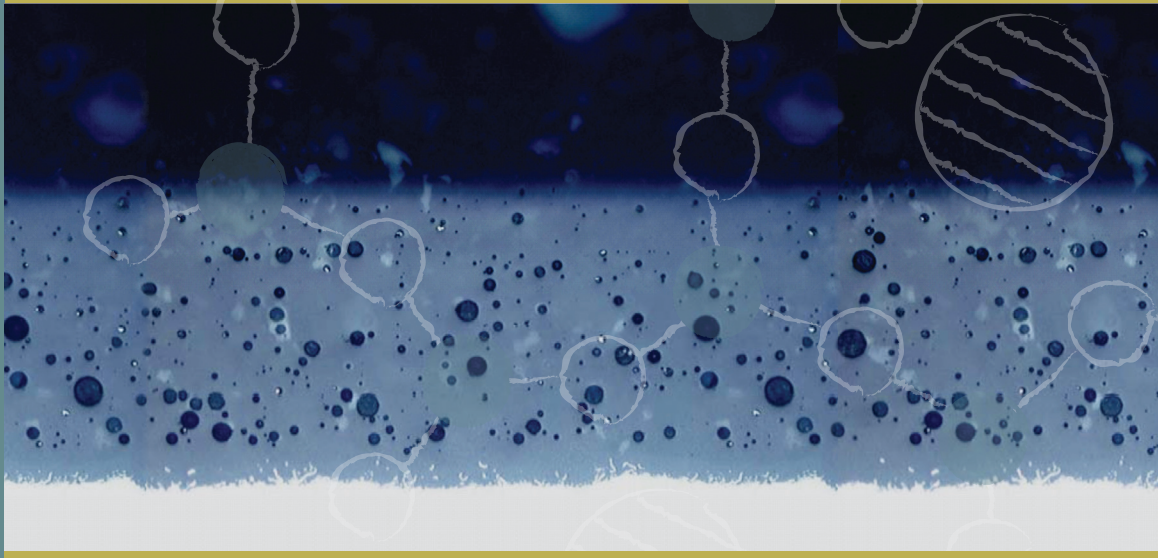
**SILVANO PAGLIUCA**, who is Secretary General of the **International Enamellers Institute** since 2004, was formerly President of the IEI to organize the 19th International Enamellers Congress in Venice, Italy in 2001 and has assisted with the 20th and 21st Congresses in Turkey and China respectively. During his career, Dr. Pagliuca was General Manager of Ferro-Italy from 1980 to 2005, establishing a complete porcelain enamelling organization with strong R/D, production and technical commercial assistance. He continues to be an industry consultant and associate of the Centro Italiano Smalto Porcellanato. Current activities include representing the IEI in the European Commission for Construction Product Drinking Water Directive as an industry observer and expert in enamelled hot water tanks. His professional background includes work with Goodyear Chemicals in Europe and SNAM Progetti of ENI Group in fine chemicals. Publications include various technical articles in *Acta Crystallographica*, *Smalti Porcellanati* and *Trattamenti e Superfici*. Dr.S. Pagliuca is a Ph.D. graduate of Rome University and holds a Master in Business Administration from Bocconi University in Milano. He is married and resides in Mantova, Italy with his wife, son and daughter.



**WILLIAM D. (DARRY) FAUST** was employed by Ferro Corporation, Cleveland, Ohio from 1968 until he retired in 2007. He participated in the organization of the 1995 International Enamellers Congress in Nashville, Tennessee and has published numerous articles through the Porcelain Enamel Institute Technical Forum. He updated the chapter on Porcelain (Vitreous) Enamels in the Kirk-Othmer Encyclopaedia of Chemical Technology 4th Edition in 1994, and edited the Porcelain Enamel Institute Technical Forum annual publication for many years through 2007. Beginning in the early 1970's he was involved in the development of electrostatic frit powder production and commercial application. He is named in five U.S. Patents dealing with various types of ceramic coatings. Mr. Faust holds a Ceramic Engineering degree from Clemson University, South Carolina and a Master of Science in Management degree from Case Western Reserve University in Cleveland, Ohio. He is married and resides in Aurora, Ohio.

**Front Cover:**  
SEM Images courtesy of Karine Sarrazy, PhD Thesis, France

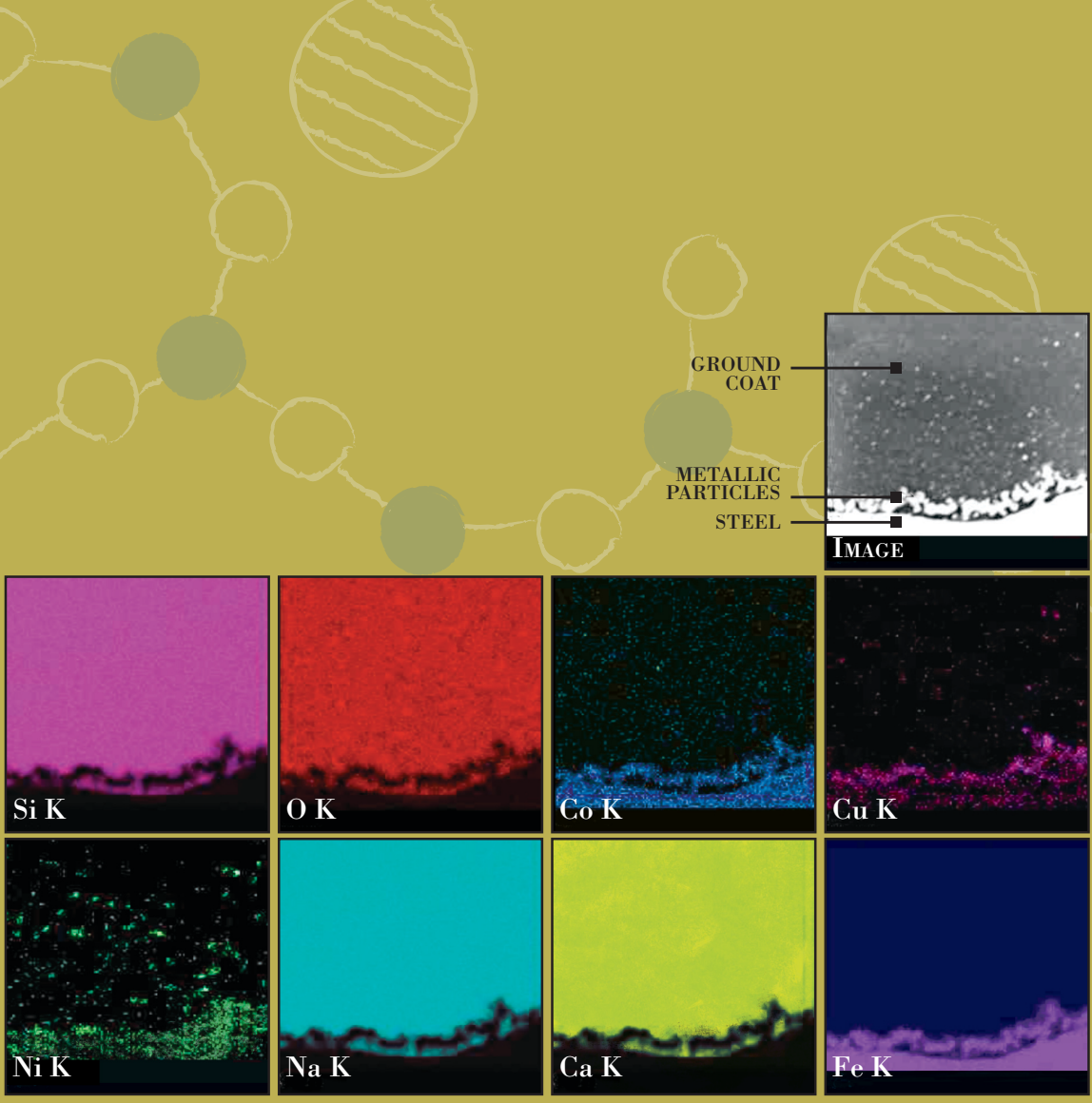
**Back Cover:**  
Photomicrograph courtesy of Ferro Corporation, Cleveland, Ohio USA.



**PORCELAIN (VITREOUS) ENAMELS**  
and Industrial Enamelling Processes  
The Preparation, Application and Properties of Enamels

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**INTRODUCTION**

The first book, *Enamels*, authored by A. I. Andrews was published in 1935 and the revision, *Porcelain Enamels*, published in 1961, provided such an excellent foundation in the technology of porcelain enamelling that the authors have focused on adding new information about the technologies, equipment and processes while leaving as much of the original text as possible. In the writing of *Porcelain (Vitreous) Enamel and Industrial Enamelling Processes* it was the deliberate intention not to substantially change the original book but to update it with the numerous developments of the past 50 years to the state-of-the-art of porcelain enamelling in the 21<sup>st</sup> Century. During this time there have been significant changes in enamel/frit chemistries, enamel application techniques (i. e. electrostatic powder), base metal chemistries and processing, metal preparation processes and end product attributes/requirements. There are an additional 5 appendices on new topics of interest to enamellers. Over the years this book has been an invaluable resource for industrial enamellers, frit developers and all students of porcelain enamelling. This industry continues to make progress by employing contemporary technologies, developing new materials and implementing superior processes with the focus of improving manufacturing efficiencies and controlling complex production processes while delivering better porcelain enamelled end-products to the consumer. The worldwide enamelling industry, represented by the various national organizations and the International Enamellers Institute have been key contributors to the growth of porcelain enamelling technologies by their work to provide venues for the exchange of technical information and the dissemination of this information to enamellers in published literature. This has been a cooperative international effort and you will notice that in the English text both Metric and English units of measure have been used. We offer sincere thanks to the contributions of the many material and equipment suppliers, industrial enamellers, engineers, scientists, designers and artists who have helped grow the application and use of this technology by sharing the results of their work with industry colleagues. While there is certainly more information on the topic of porcelain enamelling available in today's wealth of literature, it has been our intention, as it was with Dr. Andrews, to put much of it into one book.

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