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Jin Cheng* (jcheng@fudan.edu.cn), School of Mathematical Sciences, Fudan University, Shanghai, Shanghai 200433, Peoples Rep of China, **Shuai Lu** (shuai.lu@oeaw.ac.at), Johann Radon Institute for Computational, and Applied Mathematics, A-4040 Linz, Austria, and **Masahiro Yamamoto** (myama@ms.u-tokyo.ac.jp), Gardaute School of Mathematical Sciences, the University of Tokyo, Tokyo, 153-8914, Japan. *Reconstruction of the Stefan-Boltzmann coefficients on the heat transfer process.*

In this talk, we present our results about an inverse problem on the determination of boundary coefficients within the framework of Stefan-Boltzmann radiation conditions for the heat transfer process in a solid material. The problem is motivated by the corrosion detection in the production of zinc-coated steel sheets. The mathematical formulation for the forward and inverse problem is introduced in the context and uniqueness of the inverse problem is proved. The finite difference method is utilized for the discretization of the forward problems. Based on our analysis, we propose a reconstruction method for solving the inverse problem. Some regularization techniques are implemented to overcome the ill-posedness of the problem. Numerical simulation shows that the reconstruction method is stable and effective. (Received September 12, 2009)