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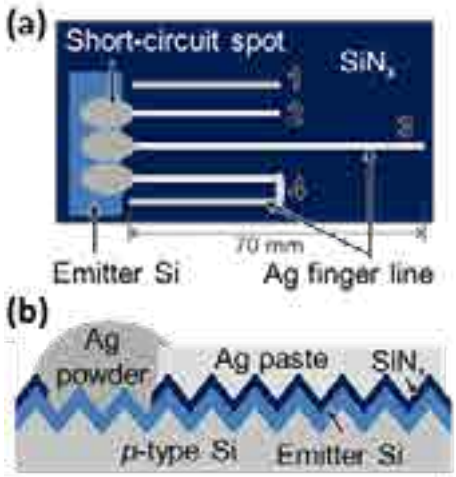
## Electrochemical characteristics of firing reaction for screen-printed Ag contact formation of crystalline Si solar cells

**Joo-Youl Huh**[1] and **Hee-Soo Kim**[1]
[1]Department of Materials Science and Engineering, Korea University, Seoul, Republic of Korea

Printing Ag paste followed by spike firing at a peak temperature of ~800oC is the most widely used technique to produce front-side metallization of crystalline Si solar cells. Recent study revealed that the reactions involved in fire-through contact formation were electrochemical reactions where the molten glass acted as an electrolyte. When the sintered bulk Ag and Si emitter separated by a molten glass layer were accidently short-circuited during the firing process, the $Ag^+$ ions dissolved in the molten glass could not be reduced at the Si emitter surface, leading to poor contact quality without Ag crystallites formed onto the emitter surface. This study explored further the electrochemical nature of contact firing reactions with focus on the extent of the short-circuiting effect along the Ag finger line as moving away from a short-circuit spot. The behavior of Ag crystallite formation at the contact interface was examined after contact firing of screen-printed Ag finger lines with various lengths and patterns. The present results demonstrate that the short-circuiting effect is diminishing along the finger line predominantly due to the electrical resistance of Si wafer. The results could be interpreted in terms of the mixed potential theory of corrosion.




### Biography

Joo-Youl Huh has completed his PhD from Carnegie Mellon University, USA, in 1993 and Postdoctoral Studies from Max Planck Institute for Microstructure Physics, Germany. He has been professor in Department of Materials Science and Engineering, Korea University, since 1996. He has published more than 100 peer-reviewed scientific papers. He is currently serving as a vice president of Korea Institute of Metals and Materials (KIMM).

jyhuh@korea.ac.kr

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