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Formation of chemical compound layer due to reaction-diffusion process

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Abstract content
   (Max 300 words)
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We developed a model that describes the growth of AB-chemical compound layer at the interfaces of two insoluble solid layers A and B.
The growth of AB compound occurs in two stages: the first stage is controlled by interfacial reaction at one interface and diffusion at the other and the second stage by diffusion at both interfaces. During each of these stages, the reaction between A and B atoms occurs only at the interfaces and the growth of AB-compound takes place concurrently at both interfaces of the solid layers. The total growth of AB compound arises from the sum of AB compound formed at both interfaces during the two stages.
The critical thickness of AB compound with its corresponding critical time, at the transition point between the interfacial and parabolic growth, is determined during the first stage of the growth.
Based on the result of the model, we determine the critical thickness of palladium silicide (Pd2Si) and our estimation agree fairly well with experimental result. We further use the model to investigate the moving species during the growth of Pd2Si taken into accounts three possibilities: when palladium is the dominant species, silicon dominating during the silicide growth, and finally both palladium and silicon atoms diffusing simultaneously during the silicide growth. The result obtains show that silicon is the most likely dominant species during the growth of Pd2Si layer and it is consistent with experimental reports.

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Main supervisor (name and email)
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