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On sample structure for fabricating micro-material by electromigration

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Electromigration (EM) is a physical phenomenon of atomic diffusion with high density electron flow. EM is known as a negative phenomenon for electronic devices because the formation of hillocks and voids induced by EM deteriorates a metal line, and many researchers have reported various ways for preventing EM. On the other hand, our research group has developed the fabrication technique for micro-materials such as micro-wires by utilizing EM. The EM technique for fabricating 1D metallic micro-materials has unique characteristics including single crystalline, pure material and high-aspect ratio. The stress gradient due to EM, which can be controlled by structure design of passivation and artificial hole, contributes to intentional fabrication of micro-materials. The passivation has a role in controlling the stress generation because it restrains the deformation of metal line caused by EM and then high compressive stress for discharging atoms is generated at certain area in a metal line under a passivation. The artificial hole through which metallic micro-material can be formed is also key component in the EM technique. In the EM technique, it is important to design a sample structure with passivation and artificial hole for advancing the fabrication performance. In this work, we report the effect of structures which are passivation and artificial hole on the fabrication of micro-material in the EM technique.

Biography

Y Kimura received his Bachelor of Engineering degree in 2012 and his Master of Engineering degree in Mechanical Engineering in 2014, from Tohoku University, Sendai, Japan. He is a Graduate student at Saka-Laboratory of Tohoku University.

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