다공질 양극산화 피막을 이용한 고균일 다결정 실리콘의 성장

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Growth of High Uniform Polycrystalline Grain on the Highly Ordered Porous Anodic Alumina

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Abstract : In the conventional crystallization method, thepoly-Si TFTs show poor device-to-device uniformity because of the random location of the grain boundaries. However, our new crystallization method introduced in this paper employed substrate-embedded seeds on the highly ordered anodic alumina template to control both the location of seeds and the number of grain boundaries intentionally. In the process of excimer laser crystallization (ELC), a-Si film deposited on the anodic alumina by low pressure chemical vapor deposition (LPCVD) is transformed into fine poly-Si grains by explosive crystallization (XC) prior to primary melting. Atthe higher energy density, the film is nearly completely melted and laterally grown by super lateral growth (SLG) from remained small part of the fine poly-Si grains as seeds at the Si/anodic alumina interface. Resultant grain boundaries have almost linear functions of the number of seeds in concavities of anodic alumina which have a constant spacing. It reveals the uniformity of device can be enhanced prominently by controlling location and size of pores which contains fine poly-Si seeds under artificial anodizing condition.

Key Words : anodic alumina, crystallization, device-to-to uniformity, template