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Crystalline Textures on the Al-Ni-Co Quasicrystal Surface

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**Abstract:** We have generated cubic Al alloys as commensurate single crystals on the tenfold-symmetry surface of the quasicrystalline Al-Ni-Co alloy by ion bombarding its surface. We find that the crystal-quasicrystal interface contains several alignments of mutual high-symmetry directions and planes. In order to explore the structural matching conditions at the crystal-quasicrystal interface, we have grown Al films on the decagonal surface of Al-Ni-Co by vapor deposition. The initial growth mode of Al is commensurate. As the coverage is increased, Al starts to grow in cubic textures breaking into multi-twinned, few-nanometer- large domains. The symmetry of the substrate determines thereby the orientation of the domains, while the degree of structural mismatch between the crystal and the quasicrystal limits the domain size.

**Key Words:** crystal, quasicrystal, interface, size selection, self assembly, epitaxy, quantum dots.

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