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Experimental demonstration of reflection minimization at 2D photonic crystal interfaces via antireflection structures TEUN-TEUN KIM, SUN-GOO LEE, MYEONG-WOO KIM, JAE-EUN KIM, HAE YONG PARK, Department of Physics, KAIST, 373-1 Guseong-dong, Yuseong-gu, Daejeon, Korea, PHOTONIC CRYSTAL LAB. DEPARTMENT OF PHYSICS, KAIST TEAM — We experimentally confirm that the antireflection structures effectively minimize the unnecessary reflections of self-collimated microwave beams in a two-dimensional square lattice photonic crystal composed of alumina rods. The optimized design parameters for the antireflection structures are obtained from the one-dimensional antireflection coating theory and the finite-difference time-domain simulations. Measurements of the transmittance through the photonic crystal samples with and without the antireflection coating structures agree well with the simulation results. Measured results show that the photonic crystal with an antireflection coating structure yields transmittance of more than 80% of the incident power near the self-collimation frequency, which is more improved transmittance with wider band compared to the case without the antireflection coating structure.

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