Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Content

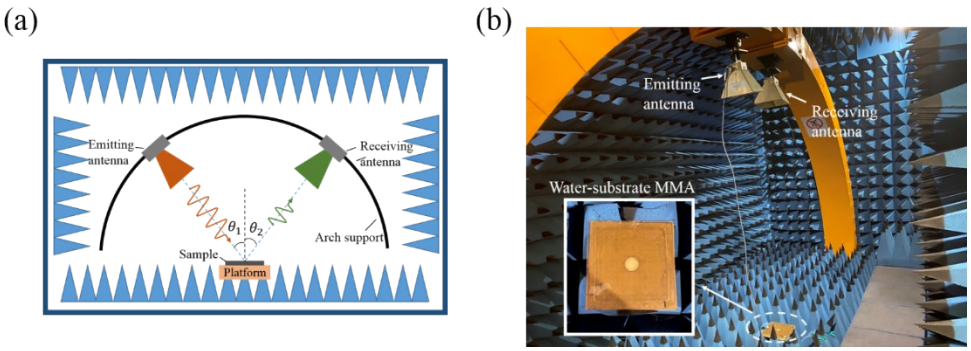

Fig. S1. (a) Schematic diagram of the microwave reflectivity measurement scheme, and (c) image of the reflectivity measurement setup in the microwave anechoic chamber.

The reflection magnitude of the sample was measured in free space using a network vector analyzer system (ZVB 20) and a pair of antennas, in which the effective scanning range was 1.0–18.0 GHz. The schematic diagram and equipment for the microwave reflectivity measurements are shown in Fig. S1 (a) and (b). The measurement system was placed in a microwave anechoic chamber, and the sample was placed on a platform in the center. Both antennas were fixed to an arched frame, and their positions were switched to measure the reflectivity of microwaves at different angles of incidence. θ_1 and θ_2 represent the equal incident and reflected angles of the electromagnetic wave, respectively, where the transmitting and receiving antennas were located. The incident angles of the EM wave under TE and TM polarizations for the reflective measurement ranged from 0° to 45° in 15° steps. The system was calibrated without the sample before the test. The absorptivity of the sample was retrieved from the transmittance and the reflectivity using the equation: $A(\omega) = 1 - R(\omega) - T(\omega) = 1 - |S_{11}|^2 - |S_{21}|^2$. In fact, due to the presence of the ITO backplane, most of the energy was blocked, and therefore, the transmittance was small compared to the reflectivity. Therefore, the transmittance was set to 0 when calculating the absorptivity. Therefore, the absorptivity was calculated using $A(\omega) = 1 - R(\omega) = 1 - |S_{11}|^2$.