Membrane mechanical testing was performed using a TestResources 140 mechanical tester equipped with a 5 mm diameter flat compression pin connected to a load cell for force measurement. Displacement was recorded using a high-resolution linear variable differential transformer (LVDT) with a measurement range of ±1270 µm and a linearity of ±3 µm. Compression tests were conducted on free-standing membrane samples that were punched to match the diameter of the compression pin. Each test was performed under a peak load of 150 N at a constant displacement rate of 0.1 mm per minute.