Design, characterization, and performance of feedhorn-coupled transition-edge sensor (TES) bolometers for the Cosmology Large Angular Scale Surveyor (CLASS)[1] CAROLINA NÚÑEZ, Johns Hopkins University, CLASS COLLABORATION — The Cosmology Large Angular Scale Surveyor (CLASS) is a polarization-sensitive telescope array located at 5,200 m in the Chilean Atacama Desert. CLASS is designed to characterize primordial gravitational waves (GWs) via B-mode polarization in the Cosmic Microwave Background (CMB), as evidence of an inflationary epoch during the first moments of the universe. Constraining B-modes is one of the principal goals of next generation CMB telescopes. High instrument sensitivity is required for this measurement, as it is orders of magnitude fainter than unpolarized CMB. Multifrequency measurements are also required to separate the CMB from Galactic foregrounds. Transition-edge sensor (TES) bolometers provide background-limited sensitivity, and are easily scaled to large arrays and multiple frequencies. CLASS uses feedhorn-coupled TES bolometers, voltage-biased to ~150 mK. CLASS consists of four telescopes: one at 40 GHz (Q-band) with 72 TESs; two at 90 GHz (W-band) with 518 TESs each; and one high frequency (HF) dichroic system at 150/220 GHz with 1020 TESs. We discuss the design, in-lab characterization, and on-sky performance of the CLASS detectors.

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