Networked sensor devices which respond to thermal environmental cues, via magnetostructural transitions, may be useful for energy management. This usefulness results from the sensitivity and ability to influence the magnetostructural response by changes in strain, temperature, applied magnetic field, and composition. Thin films of a model magnetostructural material, FeRh, were grown by sputter deposition with an Au cap deposited at 600°C and at 50°C. Magnetic and structural changes were characterized with SQUID magnetometry and synchrotron-based x-ray diffraction. Results show a decrease in the transition temperature, broadened first-order transition and appearance of a secondary phase when the Au cap is grown at 600°C. These results suggest that interdiffusion of the Au cap influences the magnetostructural transition.