Investigation of PDMS as coating on CMUTs for Imaging

A protective layer is necessary for Capacitive Micromachined Ultrasonic Transducers (CMUTs) to be used for imaging purpose. The layer should both protect the device itself and the patient while maintaining the performance of the device. In this work Sylgard 170 PDMS is tested as coating material for CMUTs through comparison of transmit pressure and receive sensitivity in immersion of coated and uncoated elements. It is seen that the transmitted pressure decreases with 27% and the receive sensitivity decreases 35 % when applying the coating using a dam and fill principle. This matches well with the estimated value of 31 %. With the coating, the center frequency was found to be decreased from 4.5 MHz to 4.1 MHz and the fractional bandwidth was increased from 77 % to 84 % in transmit. In receive the center frequency was found to decrease from 4.4 MHz to 3.9 MHz and the fractional bandwidth was decreased from 108 % to 92 %, when applying the PDMS coating.