

Abstract: The transport mechanism of detrapped charges was investigated in thermally wet grown SiO₂ electrets, which were first charged by the corona method or by electron - beam irradiation and then aged at different temperatures. The discharge and retrapping behavior was analyzed with a recently suggested method for determination of the charge centroid and charge density and by measuring open - circuit thermally stimulated discharge current spectra. Thus, the thermal activation process could be compared with the local redistribution and the decay of the trapped charges. It was found that the fast retrapping effect plays the dominant role for the released negative charge carriers. For positive charge carriers, however, this could not be confirmed. Independent of the charging polarity, it could be shown that the aging procedure resulted in a controlled shift of the charge centroid from a near surface region up to several hundred nanometers deep into the bulk of SiO₂. Unexpectedly, samples treated with hexamethyldisilazane exhibited a larger shift of the charge centroid accompanied by a stronger charge decay compared to untreated samples.