

OPTICAL PROPERTIES OF SiO<sub>2</sub>-FILMS  
IMPLANTED WITH SILICON  
AND CARBON IONS

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S u m m a r y

We report the results of photoluminescence (PL), Raman scattering, and electron paramagnetic resonance studies of SiO<sub>2</sub> films. The films were implanted with Si<sup>+</sup>, or C<sup>+</sup> ions, or with both types of ions with the following annealing. It is shown that the PL bands from SiO<sub>2</sub>: Si<sup>+</sup> films at 620 and 740 nm are associated with implantation-induced defects and Si nanocrystallites formed by thermal annealing ( $T \geq 1000$  °C), respectively. The PL band at 600 nm observed in SiO<sub>2</sub>: C<sup>+</sup> films after annealing at  $T \geq 600$  °C is related to the formation of carbon precipitates. A correlation between the intensity of this band and the shift of a characteristic carbon band in the Raman spectrum is found. The PL band at 450 nm is observed in SiO<sub>2</sub> films implanted with Si<sup>+</sup> and co-implanted with C<sup>+</sup> ions. This band can be assigned to SiC nanocrystallites, formed on a long high-temperature thermal annealing.