

# SiO<sub>2</sub> as Oxygen Target to Study Nuclear Reactions Induced by Protons in the Hadrontherapy Energy Range

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**Abstract.** The commercially available SiO<sub>2</sub> samples were successfully used as nuclear targets to study proton-induced reactions on oxygen in the energy range used in hadrontherapy. The stack of target was irradiated simultaneously with proton beam of initial energy equal to 58 MeV. The reactions (p,d), (p,α) and (p,αd) on <sup>16</sup>O lead to the production of β<sup>+</sup> emitters <sup>15</sup>O, <sup>13</sup>N and <sup>11</sup>C. Their decay, leading to the emission of two 511 keV annihilation γ-quanta, was measured in LaBr<sub>3</sub>:Ce scintillation detectors. Decay spectroscopy of 511 keV line was applied, allowing to disentangle β<sup>+</sup> decays with relative intensities determined within few % precision. No β<sup>+</sup> activity originating from the short-lived reactions on Si was observed, as the measurements started few minutes after the irradiation. No significant modification of the surface of irradiated SiO<sub>2</sub> targets was observed in AFM study; however, some changes are seen.