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## Carbon coatings of low secondary electron yield for particle accelerator applications

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The intensity of the modern particle accelerators using positively charged beams is limited by the electron cloud phenomenon. Electrons generated either by interaction with the residual gas or as photoelectrons from synchrotron radiation can be accelerated toward the vacuum pipe walls and can generate secondary electrons. These can multiply to equal the charge of the beam if the secondary electron yield (SEY) of the beam pipe walls is sufficiently high, typically above 1.1 to 1.3 for the maximum SEY. The resulting effect on the machine is a heat load on the cryogenic vacuum parts, a perturbation of the beam emittance and a high level of noise on the beam monitoring devices. The secondary electron yield can be lowered with appropriate coatings, as non-evaporable getters on the bakeable parts and carbon coatings on the regions which cannot be heated. The development of carbon coatings for particle accelerator applications will be presented. This option is presently adopted for the preparation for the High Luminosity Large Hadron Collider (LHC) phase: a staged deployment of carbon coating on the magnets of the Super Proton Synchrotron is foreseen and the application of carbon coatings is under investigation for the triplet magnets close to two of the interaction points of LHC