Secondary electron emission from borosilicate glass under electron impact

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Under charged particles impact, insulator surfaces can be charged up. If the incident beam is positive the insulator can charge up only positively partly because the incident positive charge can accumulate on the surface and partly due to the electron emission from the surface thereby increasing the positive charge on the surface. But what happen if the incident beam is negative? In this case the insulator either charges up positively or negatively depending on the secondary emission yield. If one impact electron generates in average less than one secondary electron the surface will charge up negatively and if generates more than one secondary electron than will charge up positively.
Along this line we performed extended Monte Carlo simulation by including charging dynamics, based on the classical transport theory, when both the elastic and inelastic collision are taken into account, to determine the secondary electron emission yield from borosilicate glass by electron impact. The incident electron energies were chosen between 200 eV and 15 keV. We found strong energy dependence for the secondary electron emission yield. Our calculations show that while at low electron impact energies the insulator charges up positively at high electron impact it charges up negatively.

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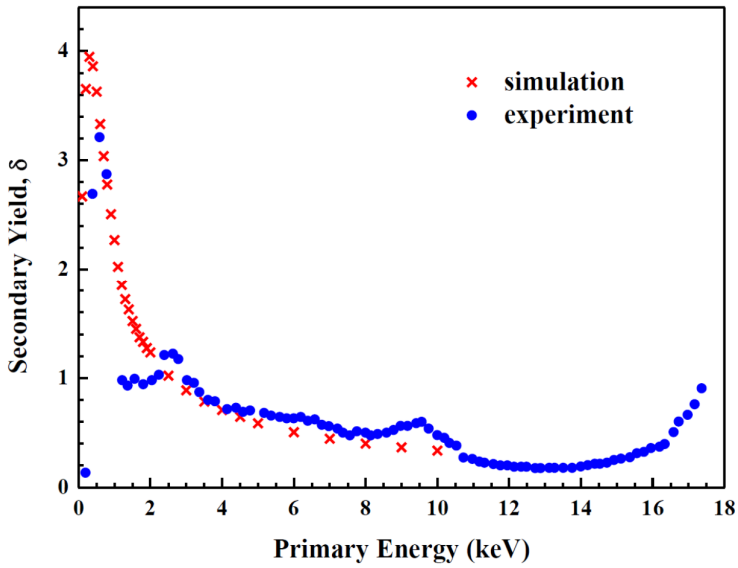

Figure 1. Secondary electron yields emitted from borosilicate glass at various primary electron energies.