In this work we investigate the $^{252}$Cf induced desorption of clusters from Al$_2$O$_3$, MgO and SiO$_2$ surfaces. The time of flight mass-spectrometer has a flight path of 1 m and a mass resolution $m/Am\approx 750$. The fission-fragments hit the sample perpendicular from the back. The desorbed secondary ions are accelerated (acceleration voltage 10 kV) within a distance of 3 mm, traverse the flight path and impinge on a CsJ coated metal plate. The secondary electrons from this plate are focused into a chevron channel plate. For the time of flight measurement a time to digital converter was used, which is able to accept 30 stop signals correlated to one start signal.

1. Spectra from Al$_2$O$_3$ samples

The figures 1 and 2 show mass spectra obtained from a 5 μm Al-foil which had been exposed to normal room atmosphere. The sample surface is therefore covered by a passivating layer consisting of Al$_2$O$_3$ and Al(OH)$_3$.

The mass spectrum of positive ions clearly exhibits three cluster series. The most pronounced series (marked by plain numbers in figure 1) consists of [(Al$_2$O$_3$)$_n$AlO]$^+$ clusters, which can be traced up to $n = 13$ ($m = 1368.3$) in the spectrum. The second series (marked by ( )) consists of [(Al$_2$O$_3$)$_n$H]$^+$ clusters. It terminates for $n = 9$ ($m = 918.5$). [(Al$_2$O$_3$)$_n$Al$_2$O$_2$]$^+$ clusters form the third series, which ends for $n = 6$ ($m = 697.6$). It is interesting to note, that the intensity of the $n = (2)$ cluster ($m = 204.9$) in the second series is
Figure 1: Mass spectrum of positive ions desorbed from a Al₂O₃ sample

Figure 2: Mass spectrum of negative ions desorbed from a Al₂O₃ sample (lower mass region)