Oxygen evolution was investigated on model, mass-selected RuO$_2$ nanoparticles in acid, prepared by magnetron sputtering. Our investigations include electrochemical measurements, electron microscopy, scanning tunneling microscopy and X-ray photoelectron spectroscopy. We show that the stability and activity of nanoparticulate RuO$_2$ is highly sensitive to its surface pretreatment. At 0.25 V overpotential, the catalysts show a mass activity of up to 0.6 A mg$^{-1}$ and a turnover frequency of 0.65 s$^{-1}$, one order of magnitude higher than the current state-of-the-art.