

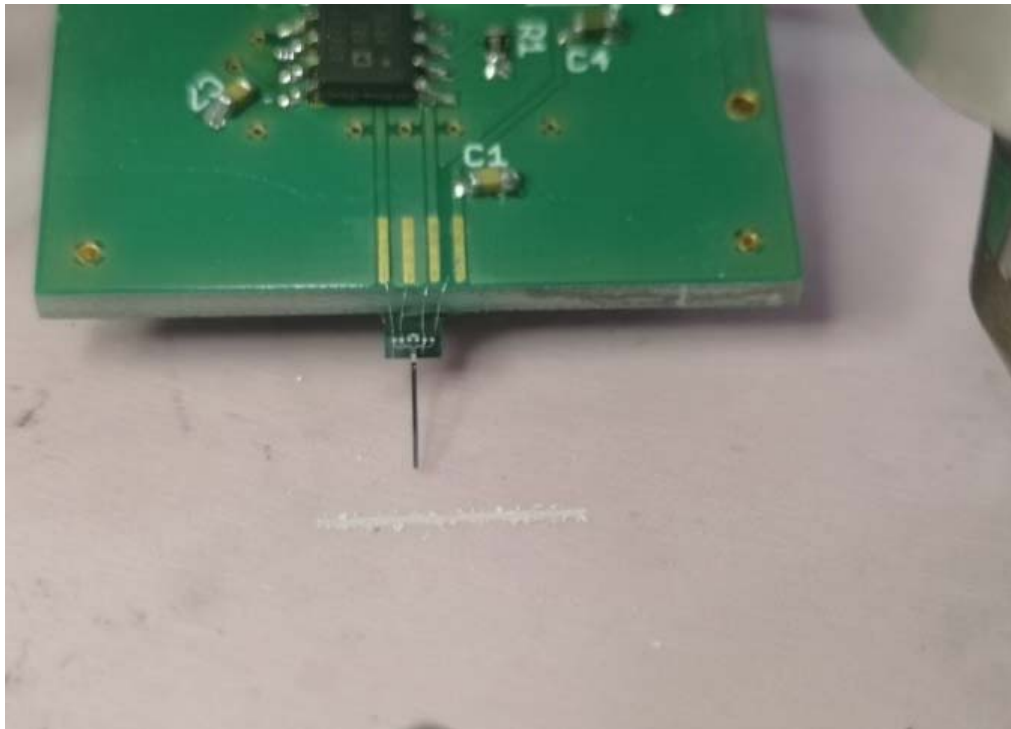
## ***In situ* Microprobe Monitoring of Progressive wear on Alumina**

Mark Gee, Tim Kamps, John Nunn, Linda Orkney

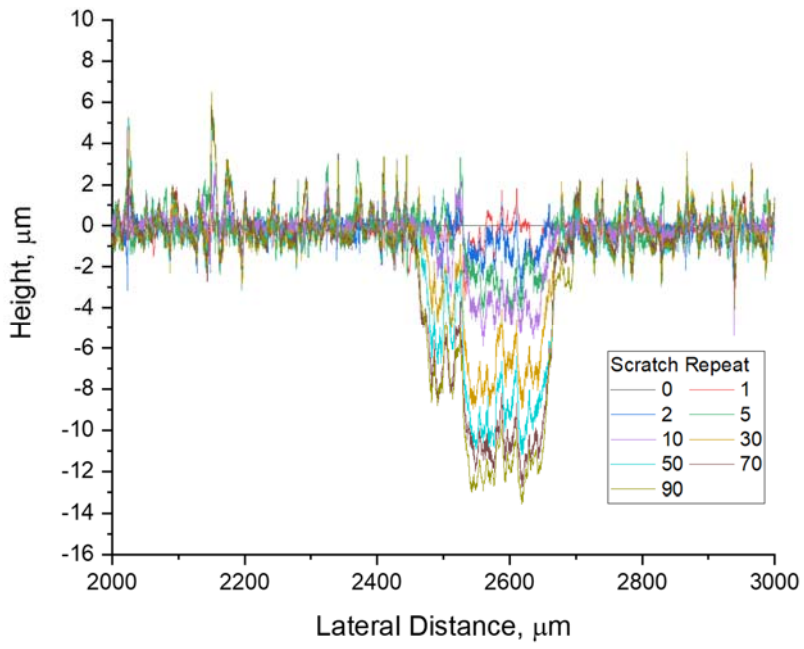
National Physical Laboratory

An experiment was carried out using a fast piezoresistive microprobe to evaluate the progressive damage caused to an alumina ceramic sample. The microprobe successfully measured the evolution of wear damage in a ceramic material. The results of the increase of scratch area with repeat scratches have improved quantification over previous measurements that normally use measurement of the width of the scratch and assumptions about how well the shape of the scratch conforms to the geometry of the indenter.

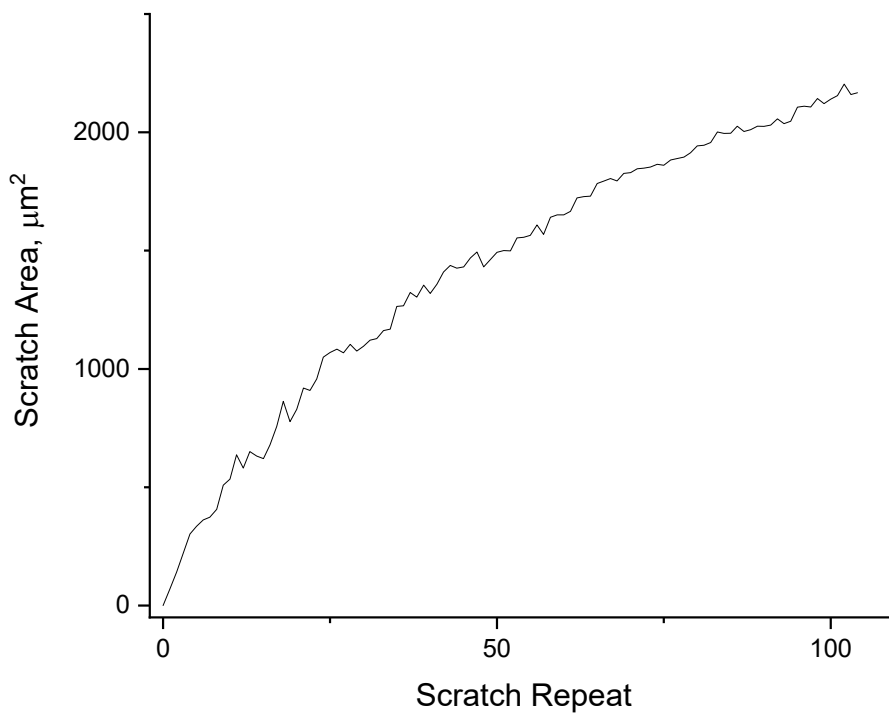
The work has also enabled measurements protocols to be defined for the use of the microprobes for the *in situ* measurement of wear damage and its progression with further mechanical contact. It has shown that post processing of the profile data is crucial to eliminate inaccuracies by processes such as levelling of the profile data and ensuring that the profile positions are adjusted so that good positional relocation is achieved.



Scratched alumina sample (pink) with microprobe in position to take a profile across the scratch



Development of damage shown by increase in depth of scratch as number of scratch repeats increases



Quantitative increase in scratch area with scratch repeat.