New microanalysis capabilities at the Melbourne pelletron

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Recent funding provided by the Federal government has allowed considerable investment in new equipment and development of new capabilities for the Nuclear microprobes and particle accelerator facility at The University of Melbourne. Modernisation of the data collection and analysis facilities has allowed us to greatly expand our elemental mapping and microanalysis capabilities. Large area elemental maps can now be routinely produced over regions of the order of $\sim$1 mm in at least one dimension and at a resolution of $\sim$1 μm using particle induced X-ray emission (PIXE) and ionoluminescence (IL) microscopy. Mapping features over such large areas at micron resolution is necessary for mineral analysis in ore deposit research in certain instances. The experiments produce exquisitely detailed data but rely on a high level of accelerator stability and reliability. In this presentation we will provide an overview of the new data collection facilities and provide examples of the mapping capabilities and discuss their value in ore deposit research. To expand our microanalysis capabilities to a much greater extent we have invested in development of a new target chamber that will house a version of the MAIA pixelated X-ray detector developed by CSIRO and Brookhaven National Laboratory. This new detection system will provide a quantum leap in high definition and high throughput PIXE imaging in the Melbourne Pelletron laboratory. It will be the most advanced PIXE system anywhere and provide a real boost in capability for trace element imaging. Here, we will give an overview of the capabilities of this system and give an update on progress towards its implementation.

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