

STUDENT 4

EXPLORING THE INTERACTION BETWEEN TRANSITION METAL CLUSTERS AND ATOMS

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Transition metals play an important role in many areas of chemistry such as catalysis and organometallic synthesis. Small metal clusters hold exciting new possibilities in this area due to their differing properties compared to their bulk counterparts. We have created such gas phase metal clusters by coupling laser ablation of a metal rod with a supersonic expansion. They are then probed and analysed using laser ionisation techniques and mass spectrometry.

Photo-Ionisation Efficiency (PIE) experiments have been performed on Ta_nC_m ($n = 3-4$, $m = 0-4$) clusters to determine their ionization potentials (IPs). An oscillatory behaviour is observed such that clusters with an odd number of carbon atoms have higher IPs and clusters with an even number of carbons have lower IPs. These results will be presented to gain an insight into the interaction of carbon atoms with small tantalum clusters. A review of Mass Analysed Threshold Ionisation (MATI) as a technique for structural determination of clusters will also be given.