Production of aluminium cluster polyanions

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Interest in the physics and chemistry of multiply-charged anions has grown considerably during the last two decades. What started with a number of experimental observations of gas-phase dianionic clusters[1] and fullerenes[2,3] in the mid 1980's and early 1990's has since developed into an independent field of research investigating both the production and properties of polyanionic species[4,5,6]. One production method, the "electron-bath" technique[6] involves the exposure of stored cluster monoanions to a 'bath' of low-energy electrons for extended reaction periods. The technique, originally applied to monovalent elements[7] (Cu, Ag and Au) and later to fullerenes[8], has also proven to be suitable for the production of metal cluster polyanions composed of trivalent aluminium[9]. In addition to dianionic species[9], recently tri- (Fig.1(a)) and tetra-anionic (Fig.1(b)) aluminium clusters have been produced. This contribution presents the results of experiments in which both the production procedure and the size-dependence of aluminium cluster polyanion creation have been investigated.

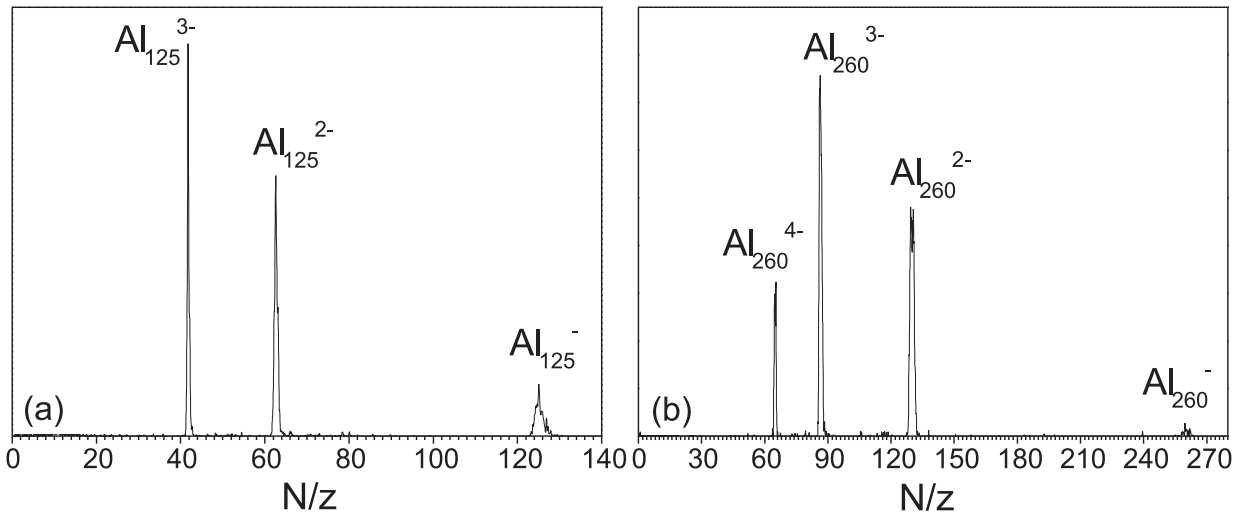

Figure 1: Abundance spectra for (a) Al_{125} and (b) Al_{260} after exposure of the monoanions to an "electron bath".

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