

There are no experimental verifications of the electronic structure of Md, but this has been calculated by several methods to be  $5f^{13}7s^2$  in which the ground state level is  $^2F_{7/2}^2$ .

The separation of Md from the other actinides can be accomplished either by reduction of  $Md^{3+}$  to the divalent state<sup>3</sup> or by chromatographic separations with Md remaining in the tripositive state. Historically,  $Md^{3+}$  has been separated in columns of cation-exchange resin by elution with  $\alpha$ -hydroxyisobutyric acid solutions.<sup>4</sup> This method is still widely used even though extraction chromatography requires less effort and attention to technique. Horwitz and coworkers<sup>5</sup> developed a highly-efficient and rapid separation of  $Md^{3+}$  by employing  $HNO_3$  elutions of columns of silica powder saturated with an organic extractant, bis(2-ethylhexyl)phosphoric acid. The separation of Md from Es and Fm could be completed in under 20 minutes and had the advantage of providing final solutions of Md free of complexing agents that might be an interference in subsequent experiments.

When the divalent state of Md was first discovered, extraction chromatography was used to prove that the behavior of  $Md^{2+}$  was dissimilar to that of  $Es^{3+}$  and  $Fm^{3+}$ .<sup>3</sup> The extractant, bis(2-ethylhexyl)phosphoric acid (HDEHP), has a much lower affinity for divalent ions than it does for the tri- and tetravalent ones. Thus, the extraction of  $Md^{2+}$  is much poorer than the extraction of the neighboring tripositive actinides as indicated by the results shown in Table 1. This became the basis for a separation method in which tracer Md in 0.1M HCl is reduced by fresh Jones' Reductor in the upper half of an extraction column containing HDEHP absorbed on a fluorocarbon powder in the lower half. Mendeleevium, in the dipositive state, is rapidly eluted with 0.1M HCl whereas the other actinides are retained by the extractant. The separation is