



## ACTINIDE CARBONATE COMPLEXES

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$M(\text{CO}_3)_i^{z-2i}$  stoichiometries are well established for  $z = 4$ , and  $i = 4$  and  $5$ , for several Actinide and Lanthanide  $M^{4+}$  ions. However,  $i = 6$  was also proposed for the limiting complexes of Th and Ce(IV). Similarly the stoichiometries of  $M^{3+}$  carbonate and sulfate limiting complexes are debated ( $i = 3$  or  $4$ , and  $2$  or  $3$  respectively). These problems on the stoichiometries induce uncertainties in the measurements of formation constants for all the carbonate and sulfate complexes, typically for those stable in environmental waters. Maximum possible values are proposed for the formation constants of possible  $M(\text{CO}_3)_i(\text{OH})_j^{4-2i-j}$  complexes based on published solubility data, while formation constants were measured for  $M^{3+}$  carbonate or sulfate complexes by using TRLFS, and consistency with previous determinations is discussed.