Aluminium polycations in applications: metal speciation, model systems preparation and bioinorganic interactions in aqueous solutions

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Over the last decades, advancing the knowledge of aluminium aqueous chemistry went hand in hand with the development of synthesis, separation and characterization techniques to produce and monitor molecules and colloidal phases in constant interconversion. In this talk we first introduce aluminium ions hydrolysis and condensation pathways in aqueous solution, and describe some of the many resulting molecular species. aluminium polycations, such as Al_{13} and Al_{30}, are used on a global scale for water treatment, catalysis or in antiperspirants. We present a convenient approach for the targeted synthesis of such molecules in solution or powder form. These polycations are then used to better understand how aluminium is acting in applications, how the different aluminium species interconvert, and what results from aluminium encounters with the biological world.