A Comprehensive Analysis of the Spectrophotometric and Medicinal Aspects of Ruthenium as its Coordination Compounds

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Abstract

Numerous scientific groups have been actively working on inorganic antitumor drugs for a long time, and they have developed a number of metal complexes, particularly those involving ruthenium in different oxidation states. Owing to their low systemic toxicity and selective antimetastatic effects in animal models, ruthenium complexes are currently a hot topic in medicinal chemistry. Ruthenium compounds appear to bind to DNA and enter tumor cells. In addition to their antitumor activity, ruthenium complexes are also being evaluated against other diseases, such as type 2 diabetes, Alzheimer's disease, and HIV. Ruthenium coordination and organometallic chemistry have expanded and been assessed in recent years. The primary focus of the analytical measurement of Ru and its potential as a bioactive agent in medicine is the coordination complexes of Ru with various ligands, which stems from its unique properties and its status as a valuable platinum group metal. The formation of Ru-based complexes and their extensive applications in fields such as biology, nanoscience, medicine, photoactive materials, production of solar cells, catalysis, and incorporation into platinum and palladium alloys have been the subject of numerous publications in recent years. The unique ability of ruthenium to exist in several oxidation states may be related to these developments. For these reasons, a wide array of analytical methods for metal determination have been successfully developed. Amongst all, UV/VIS spectrophotometric methods of determination, due to their simplicity, cost effectiveness, rapid analysis procedures and versatility, are put together in the present article. The review also examines ruthenium complexes with potential medicinal applications.

Keywords: Ruthenium, Coordination compounds, Antitumor drugs, Spectrophotometric

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