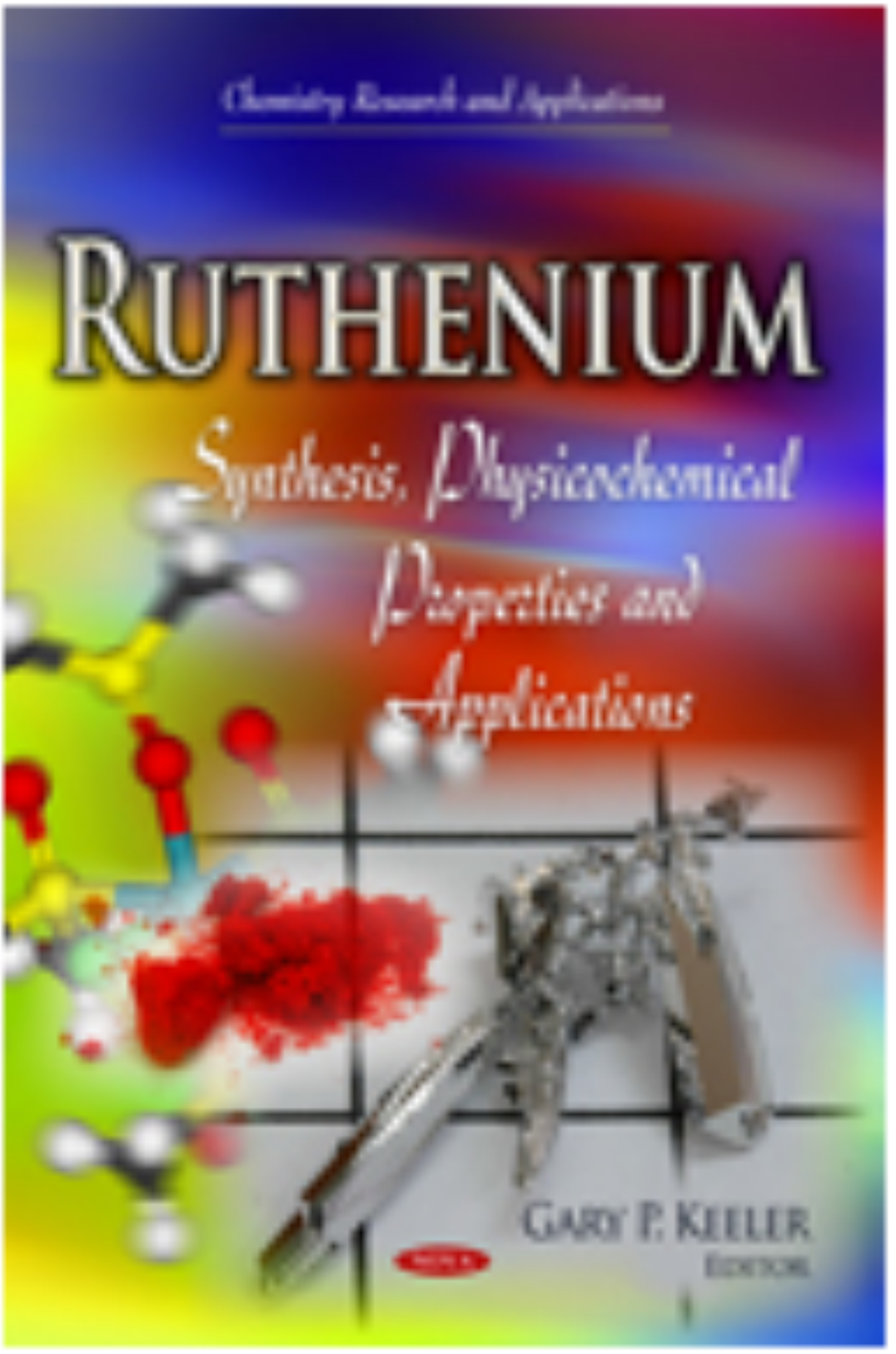
Chemistry Research and Applications

RUTHENIUM

Synthesis, Physicochemical Properties and Applications



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"RuCp" a Versatile Moiety: From NLO to Antitumor Properties (pp. 105-164)

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Abstract:
Organometallic chemistry and particularly organotransition metal complexes have been an intensive area of research which growth was mainly motivated by the impressive achievements in the field of homogeneous catalysis. In fact, the development of catalysis served as foundation for many important industrial processes. Moreover, the fascinating properties of organometallic compounds encouraged the development of its chemistry for several other applications, ranging from material chemistry, where several technological applications were found (integrated optics, molecular switches, dye-sensitized solar cells (DSSCs), organic light emitting diodes (OLED's), to bioinorganic chemistry where they appear as potential drugs for several diseases (cancer, diabetes, malaria, etc.).
In this frame, ruthenium organometallic complexes have revealed a prominent role in all these areas due to their great scope in molecular engineering. The vast diversity of frameworks and structures, associated with their stability in several oxidation states, bonding modes and electronic features place ruthenium compounds among the most successful organotransition metal complexes studied to date. In particular, η5-monocyclopentadienylruthenium derivatives ("RuCp") have been thoroughly studied due to the promising results in the field of nonlinear optics. More recently, the "RuCp" fragment emerged in the new fascinating bioorganometallic subject, displaying important results in the area of potential agents for cancer therapy.
These apparent greatly incongruent endeavors might find some common explanation in the unique characteristics of this versatile metal fragment. This chapter presents an overview of the work published during the last two decades in the fields of nonlinear optics and bioorganometallic chemistry concerning the "RuCp" scaffold. An outlook of the synthetic methods involved and the relevant properties for each purpose is also discussed. It will be shown the versatility of the "RuCp" on the design of different organometallic environments, with structural features aiming a particular application.