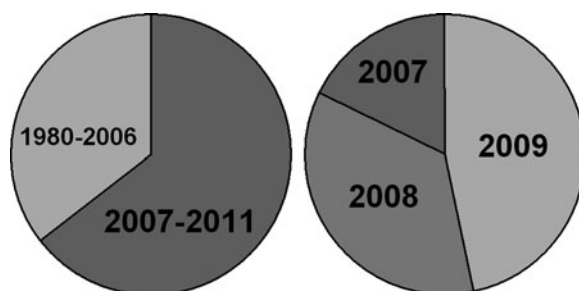


# Preface

In recent years, nanostructured coatings are used on surface of different parts with the aim of increasing their resistance against erosion, corrosion etc. The scale of nanomaterials should be classified from 1–100 nm which means clusters or (atomic) nuclear pellet with no less than 100 nm, fibers less than 100 nm in diameter and films thickness less than 100 nm. In this range nanomaterials show specific properties which they did not show for bigger dimensions such as micrometers. This effects which have come from size of nanomaterials are known as “size effect”. Today, with the development and expansion of nanotechnology, nanostructured coatings are widely used in military, aerospace, electronic and magnetic industries, etc. due to having appropriate and unique properties such as magnetic properties, corrosion resistance, high hardness and wear strength. They have been developed remarkably in recent two decades. These coatings improve properties of substrate. Hence, coatings resistant against erosion and corrosion, self-lubricant system and hard coatings can be produced. Increased attention to size effect in nanostructures during recent years can be seen in Fig. 1.

In comparison with coatings with micrometer-ranged thickness, nanostructured coatings usually enjoy better and appropriate properties. Strength and resistance



**Fig. 1** Comparison among number of journal articles about size effect of nanostructures identified on February 25, 2011 using the Scopus search engine. The key words used were (“size effect” + nano) just in title, abstract and keywords

against erosion are of the properties which have been taken into consideration. Transparency is of paramount importance in application of nanometer-ranged coatings. These coatings enjoy unique magnetic properties and are used with the aim of producing surfaces resistant against erosion, lubricant system, cutting tools, manufacturing hardened sporadic alloys, being resistant against oxidation and corrosion. This book reviews researches around fabrication and classification of nanostructured coatings with focus on size effect in nanometric scale. Size effect on electrochemical, mechanical and physical properties of nanocoatings discussed through different chapters of the book while different examples and figures were used for better discussion.

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