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Nota di contenuto	COLOR PLATE 36 Chapter 1 Polyoxometalate-Protected Metal Nanoparticles: Synthesis, Structure and Catalysis Yifeng Wang and Ira A. Weinstock; 1. Introduction; 2. Synthesis of Polyoxometalate Stabilized Metal(0) Nanoparticles; 2.1. Control over shape and size; 2.2. Ir and Ru nanoparticles by H ₂ reduction; 2.3. Reactions of metal salts with reduced polyoxometalate anions; 2.3.1. Synthesis of nanoparticles; 2.3.2 Synthesis of complex nanostructures; 2.4. Ligand-exchange reactions; 3. Structures of Inorganic Cluster Anions Stabilized Nanoparticles 3.1. Evidence for the stabilization of metal(0) nanoparticles by polyoxometalates 3.2. Direct imaging of POM-ligand monolayers by cryo-TEM; 3.3. Electric double layer of a polyoxometalate-stabilized nanoparticle; 4. Application of POM-stabilized Au NPs in Catalysis; 4.1. Hydrogenation reactions using POM-stabilized metal NPs; 4.2. Molecular oxygen activation reactions for organic synthesis; 4.3. Other organic reactions catalyzed by polyoxometalate-stabilized metal nanoparticles; 4.4. Electrocatalysis; 5. Closing Comments; References Chapter 2 When Giants Meet Dwarves in the Same Pond - Unique Solution Physical Chemistry Opportunities Offered by Polyoxometalate Macroions Dong Li, Panchao Yin and Tianbo Liu 1. Introduction and Retrospection; 1.1. Derivation of the Debye-Hückel's limiting theory5;

1.2. General features of the DLVO theory; 1.2.1. DLVO potential and the primary and secondary minima; 1.2.2. Limitations of the DLVO theory; 2. Characterization of Macroion Solution Behaviors; 2.1. Polyoxometalates (POMs) type macroanions; 2.1.1. Characterization of the self-assembly of POM macroanions in dilute solutions 2.1.2. The driving forces that responsible for the unexpected self-assembly of macroanions 2.1.2.1. Van der Waals attractions; 2.1.2.2. Hydrogen bonding; 2.1.2.3. Counterions mediated attractions; a) Interactions between discrete macroions and counterions; b) Effect of surface charge density; c) Effect of counterion valence state and counterion hydrated size; d) Effect of ionic strength; 2.1.2.4. Solvent effect; 2.1.3. Kinetics of the blackberry formation; 2.1.3.1. Long equilibrium time; 2.1.3.2. High activation energy; 2.1.3.3. Slow nucleation and fast aggregation 2.2. Self-assembly of macrocations

Sommario/riassunto

The book highlights recent prominent results in the domain of the synthesis of new polyoxometalates with a specific attention to polyoxothioanions, and provides some novelties and perspectives in selected domains such as magnetism, luminescence and nanotechnology, and macroions self-assembly in solutions. The case of "one-pot" syntheses often used and reported in POMs synthesis is studied in terms of more complex solution speciation processes related to highly dynamical situation connected to factors such as pH, ionic strength, reaction time, temperature, counterion nature, concentration of sta

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