

Summary

Amorphous hybrid materials are specific group of materials which are arise as a results of introducing organic parts or structures into the silicate structure. Hybrid materials con serve as a valuable and modern protection layer made on metals or glass substrate as they combine several profitable properties lake high abrasion and scratch resistance with comparatively high flexibility, high corrosion resistance and resistance for degradable interaction of UV radiation.

Introduction of organic elements into the inorganic structure is possible utilizing sol-gel technique. This technique assures receiving materials with precision chemical composition and high structure and composition homogeneity on molecular level.

First part of the book was dedicated to sol-gel technique. Attention was lied especially on the relation between preparation conditions and properties and morphology of resulting material.

In the second part, results of structural studies of hybrid glasses obtained by modification of based TEOS glass with specially selected organic modifiers were presented. The following modifiers were used:

- modifiers with different carbon chain length: MTMS, OCTMO, PTMS,
- modifier with function group: GLYMO,
- linear polymer modifier: PDMS,
- cyclic modifiers: D4, VMC.

The third part consists results of tests carried out to determine if studied hybrid layers can be utilized as corrosion protection layer in case of wet chemical corrosion. The layers were produced by several methods like drawing from the solution, spin coating or electrophoretic method. Morphology, continuity, adherence to the substrate and tightness were main parameters under study. To predict corrosion protection ability, salt corrosion test and longtime test under atmospheric condition were carried out. Tightness on the microstructure level was studied by impedance spectroscopy.

It was found that the structure of hybrid materials and related physical properties depend strongly on the synthesis conditions. Selection and amount of used organic modifier allow obtain hybrid materials with specified early physico-chemical properties. Electrophoretic technique of layer application leads to tighten coating with good corrosion protection properties.