



Non-Confidential Description

Novel Environmentally Safe Coatings for Ceramer Films based on Unsaturated Oil

Technology Case: RFT-26

Invention Summary

This vegetable (seed) oil-based (drying oil) coating utilizes mixed metal-oxo clusters to improve the properties of the ceramer films.



Benefits

- **GREEN TECHNOLOGY.** Environmentally safe technology uses vegetable seed oil as one of the primary components.
- The coatings exhibit enhanced hardness without sacrificing toughness, impact resistance, or adhesion.
- A mixed metal concept results in films which exhibit superior corrosion protection for metal substrates.



Unsaturated oil stock can be made from sunflower seeds, soybeans, linseeds, and many other natural components.

Application Areas

Has potential uses with roofing materials, corrosion-resistant primers, heavy duty industrial coatings, new generation appliance (alkyd) coatings, and other alkyds or solvent based coatings.

Invention Premise

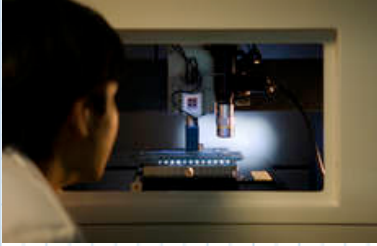
This NDSU invention is a ceramer precursor coating composition which can be used to form ceramer coatings having high tensile modulus and tensile strength while exhibiting a relatively moderate strain-at-break value. The coating composition includes an unsaturated oil stock and a sol-gel precursor which includes a mixture of at least two different sol-gel precursor species. The use of two sol-gel precursors has resulted in superior film properties over the use of a single sol-gel precursor. Examples of suitable mixed metal sol-gel precursors include mixtures which contain at least one titanium and one zirconium sol-gel precursors. Examples of unsaturated oil stock suitable for use in forming the coating composition are linseed oil, tung oil, perilla oil, sunflower oil, soybean oil, fish oil, and dehydrated castor oil, as well as mixtures of these components.



Patents

U.S. patent No. 6,096,437 "Ceramer Coating Compositions", issued August 1, 2000.

The Department of Coatings and Polymeric Materials at NDSU



The Department of Coatings and Polymeric Materials is an academic department within the College of Science and Mathematics at North Dakota State University. The department provides the only academic research focused on polymer organic coatings in North America, and is one of only very few such departments in the world. The focus on polymer coatings at NDSU goes back to 1905, when many paints were based on vegetable oils and lead pigments. The department's research specialties include:

- Polymer, organic chemistry, responsive/structured polymers, nano-material synthesis
- Corrosion science, protective coatings, conductive polymers, electrochemistry
- Physical properties of coatings, polymer physics of cross-linked systems
- Computer modeling, service lifetime prediction.

The Department of Coatings and Polymeric Materials has world class polymer, coating and corrosion characterization equipment in 20,000 square feet of the Research 1 building in the NDSU Research and Technology Park. There are permanent staff for serving outside collaborators, as well as students, post-docs, and faculty. The faculty members are all internationally recognized in their fields and contribute in a broad range of topics. The department is an integral part of the Center for Surface Protection at NDSU, where the state of North Dakota contributes to funding collaborative research that leads to increased technological employment and infrastructure in the state.

Inquiries

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