SECTION: 14
DATE: April 23, 2019

BOARD OF REGENTS

EASTERN MICHIGAN UNIVERSITY

REPORT

NEW U.S. PATENT: CORROSION RESISTANT COATINGS AND MATERIALS

ACTION REQUESTED

It is recommended that the Board of Regents accept and place on file the report on a new U.S. Patent No. 10,118,986: Corrosion Resistant Coatings and Methods using Polyepdxysilane Precursors.

STAFF SUMMARY

The attached report details a new U.S. Patent recently obtained by Professor Vijay Mannari.

FISCAL IMPLICATIONS

None.

ADMINISTRATIVE RECOMMENDATION

The proposed Board action has been reviewed and is recommended for Board approval.

[redacted]

University Executive Officer
Rhonda Longworth, Ph.D.

4/2/2019

Date

EASTERN MICHIGAN UNIVERSITY

EMU Research

Research Spotlight: Professor Vijay Mannari, US PATENT NO 10,118,986

As we bring the 2019 Summer Research Awards before the Board of Regents, it seems opportune to illustrate the transformative impact on faculty research provided by our internal research support programs.

Attached is the first page of a patent awarded to EMU through the research efforts of Dr. Vijay Mannari, Coatings Professor in the School of Engineering Technology in the College of Technology at EMU.

Issued on November 6, 2018, this is EMU's 29th United States patent and is Professor Mannari's sixth patent with EMU, and the second in a series of related patents. US Patent No. 10,118,986 was awarded for Mannari's work in developing corrosion-resistant polyepoxysilane coatings and the methods for preparing them. The coatings provide corrosion resistance for many substrate materials, including aluminum.

Professor Mannair has an impressive record of competing for and winning federal- and industry-sponsored research grants and contracts. The EMU Office of Research Development and Administration (ORDA) assisted Professor Mannari in his grant application and grant management processes, and the EMU Technology Transfer Office administered the patent application process.

US010118986B2

(12) United States Patent
Mannari

(10) Patent No.: US 10,118,986 B2
(45) Date of Patent: Nov. 6, 2018

(54) **CORROSION-RESISTANT COATINGS AND METHODS USING POLYEPDXYSILANE PRECURSORS**

(71) Applicant: **EASTERN MICHIGAN UNIVERSITY**, Ypsilanti, MI (US)

(72) Inventor: **Vijaykumar M. Mannari**, Saline, MI (US)

(73) Assignee: **EASTERN MICHIGAN UNIVERSITY**, Ypsilanti, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 810 days.

(21) Appl. No.: **14/203,075**

(22) Filed: **Mar. 10, 2014**

(65) **Prior Publication Data**

US 2014/0272420 A1 Sep. 18, 2014

Related U.S. Application Data

(60) Provisional application No. 61/777,132, filed on Mar. 12, 2013.

(51) **Int. Cl.**

C07F 7/18	(2006.01)
C08G 59/14	(2006.01)
C08G 59/50	(2006.01)

(52) **U.S. Cl.**

CPC ***C08G 59/14*** (2013.01); ***C07F 7/18*** (2013.01); ***C07F 7/1804*** (2013.01);
(Continued)

(58) **Field of Classification Search**

CPC C08G 59/14; C08G 59/504; C07F 7/18; C07F 7/1804

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

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(Continued)

OTHER PUBLICATIONS

Niknahad M., and Mannari V., "Sol-gel Derived Organic-Inorganic Hybrid Chromate-Free Pretreatment for Industrial Aluminum Alloys," poster presentation at CoatingsTech Conference 2013, Chicago, Illinois (Mar. 12, 2013).

Primary Examiner — Ling Siu Choi
Assistant Examiner — David I. Miller
(74) *Attorney, Agent, or Firm* — Marshall, Gerstein & Borun LLP

(57) **ABSTRACT**

The disclosure relates to curable polyepoxysilane compounds and compositions, methods related to curing of such compounds via hydrolysis and/or condensation to form coatings on a substrate, and coated articles formed from the curable polyepoxysilane compounds. The polyepoxysilane compounds are silane-functional precursors and can be used as coatings (or pretreatments) on various substrates (e.g., metals such as aluminum) and provide a substantial improvement in corrosion resistance relative to other anti-corrosion coatings. The silane-functional precursors can be prepared by reaction of functional silanes (e.g., amino-functional silanes or other epoxide-reactive functionalized silanes) with epoxide-containing organic or hydrocarbon compounds and oligomers/polymers thereof (e.g., glycidyl-type ethers or other epoxide-/oxirane-functionalized hydrocarbon compounds), for example including hydrocarbons with one or more aromatic hydrocarbon groups (e.g., in an aromatic polyether).

13 Claims, 3 Drawing Sheets