NEWSLETTER #4

Project activities 11/2023 - Beginning 09/2024

VIPCOAT

Virtual Open Innovation Platform for Active Protective Coatings Guided by Modelling and Optimization

MILESTONE

LATEST ACTIVITIES

EU-PROJECTS COOPERATION

VIPCOAT received funding for a period of 4 years from the European Union's Horizon 2020 research and innovation programme, which started on May 1, 2021. Our consortium comprises 12 participants (5 companies and 7 research institutions) from 8 countries (BE, DE, FR, LU, NL, NO, PT, UK) who gather all necessary background and expertise to deliver an Open Innovation Platform (OIP) to support the development of new coating materials.

www.vipcoat.eu

MILESTONE

BETA RELEASE

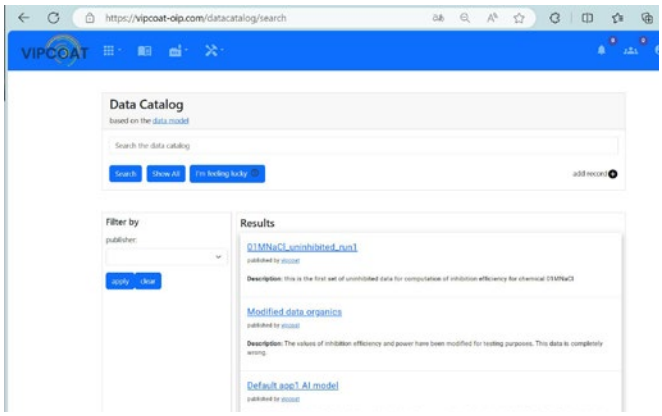
M36 Consortium and Review meeting: May 22-24, TU Delft, Netherlands

On May 23, in the frame of M36 consortium meeting, the important milestone of the project, the achievement by VIPCOAT OIP of the beta release level of the software infrastructure, has been reported and analyzed. The platform development team provided a detailed overview of the most important tasks covered by the consortium last year since alpha release of the platform has been achieved. The development and essential update have been implemented for different software modules like validation of the Open Simulation Platform for materials modelling concepts. It is related to all demonstrator cases, technical interaction and cooperation with Innovation Hubs, using achievements of related projects like Marketplace and OntoTrans. Moreover, an update of the landing page of all innovation processes steps, implementation of Translation role and Serious gaming approach on top of the OIP have been provited.

The VIPCOAT platform is based around the Business Process Modelling and Notation (BPMN) workflows with the main idea of allowing users to create and execute their own tasks and workflows. Moreover, the platform is equipped by pre-defined / pre-existing tasks hosted in task libraries. Users can also add their own specific tasks to the platform.

© VIPCOAT

OTEAPI has been integrated into the VIPCOAT architecture. OTEAPI is a service used for handling data flow and data documentation. It is connected to the data catalog from one side, and BPMN via external workers from the other. The data documentation for achieving task interoperability on the OIP has been developed to the level where it can be used and connected to other parts of the platform.



© VIPCOAT

The demonstrator Apps have been integrated at the Beta Release level and are constantly updated with new models. Continuous integration has been developed for APP1, related to the selection of optimal corrosion inhibitors and additives, and APP3, provided the computation analysis of the materials behavior in a coating defect. The modellers can update their simulation codes and reseive the live software actualisation automatically utilized by the platform.

Serious gaming idea has been extensively explored within the software developers' team, and some functionality got deployed on the OIP to facilitate it, currently at the level of initial implementation and testing.

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BETA RELEASE

Finally, the landing pages of each innovation process steps now include significant updates compared to the state presented at the level of alpha-release of the platform.

A procedure to add custom VIPCOAT BPMN elements has been explored and is available. This is done by extending the Camunda BPMN module by VIPCOAT arguments. Similarly to the BPMN editor, the DMN editor is implemented using the library dmn-js developed by BPMN.io. The library provides a graphical user interface, where a user can build a DMN table. It is extended with functionality to store any created DMN table into the project page. Once stored, the DMN library is extended and can be used as an element in the BPMN modeller.

To make Data Catalog easier to use, new logic behind uploading files is implemented. Data Catalog has been extended with scopes that are used to differentiate between a public data catalog that everyone can use, and private data catalogs available to the partnerships only. Moreover, the data catalog can now store objects in non-shared (restricted) mode. In such a way, metadata will be shared by the platform users, but the files will be hidden. The users are able to request access from the author by sending them a notification. If the author grants them permission, they will be able to use the resource like the public, non-restricted ones.

Industrial partners and experimentalists contributed very active to the design and testing of the data catalog functionalities. They are convenient that this version corresponds to industrial needs and general requirements.

The whole consortium agreed that all requirements addressing to the Milestone description in the Grant Agreement have been satisfied. Thus, VIPCOAT OIP has successfully achieved the **Beta Release level of the software infrastructure.**

During the meeting, the consortium also discussed the current stage of the modeling Apps development as well as new coatings testing and optimization. Moreover, a demonstration of the implementation of serious gaming concept at VIPCOAT OIP was provided by partners from Fraunhofer ITWM, Hereon and WIKKI.

Lisa Sahlmann (Hereon), Schladitz, Katja (ITWM), Niklas Wünstel (ITWM) © VIPCOAT

Frederico Maia (SMT) © VIPCOAT

Niklas Wünstel (ITWM), Lisa Sahlmann (Hereon), Marko Horvat (WIKKI) © VIPCOAT

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NOVEMBER

MACRAMÉ Regulatory Risk Assessors Summit

On November 28-28, 2023, VIPCOAT project contributed to the 1st MACRAMÉ Regulatory Risk Assessors Summit giving a talk on Risks Assessments in the context of the Life Cycle of Advanced Materials and participating in a panel discussion on Safe and Sustainable by Design (SSbD), LCA, effective (upcoming) regulation and other important aspects of "digital transition" edge topics.

VIPCOAT contributet to Scientific Programm and to the podium diskussion. © VIPCOAT

ECCA Congress 2023

November 21-22, 2023, the progress in VIPCOAT OIP development and the benefits for coating industry from the platform use have been presented at the industrial autumn congress of ECCA in Brussels. Additionally, interrelations between of VIPCOAT and OntoTrans projects as well as the connection of VIPCOAT and new CSA project DigiPass has been demonstrated in the lecture "Raising the Digital Maturity of Material Communities in European Projects" given by **Natalia Konchakova** and **Peter Klein**.

JANUARY

Workshop on Digitalization and Automation Boost Energy Materials Research

On January 24, **Natalia Konchakova** presented VIPCOAT OIP at the Workshop on Digitalization and Automation Boost Energy Materials Research in Rome, Italy. The coordinator demonstrated the platform as an example of digital tools supported the European Green and Digital Transition for innovative advanced materials.

Read more

Interview of industrial partners

Federico Maia (Smallmatek) was interviewed about the project, scientific challenges, the OIP functionality and benefit of industry to use the platform by journalists of Portugal national magazine "Valor Magazine". The full interview has been published on its 39th edition physically and also online.

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Read more

FEBRUARY

HaDeA Joint Workshop

VIPCOAT, MUSICODE and OpenModel sister-projects have been presented at HaDeA online Joint Workshop on Advanced Materials Characterisation and Modelling Projects, on February 26th. This collaborative event brought together a diverse range of projects, including sister projects and the councils EMMC and EMCC, all dedicated to advancing materials characterisation and modelling.

© HaDeA

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Exploitation Workshop

21.02.2024 an internal workshop on VIPCOAT OIP exploitation and Business model have been provided by **Barth Van den Bossche** and **Frederico Maia** for young researchers and PostDocs of the consortium. Important aspects of the potential exploitation router and further development of the platform have been discussed. The next workshop will be provided at M36 consortium meeting in May 2024.

Read more

EMMC full assembly meeting

VIPCOAT project has been presented by **Peter Klein** at the EMMC full assembly meeting on 9 Feb 2024. A general overview on the stage of the Open Innovation Platform has been provided. The focus has been done on VIPCOAT interoperable data exchange and data documentation.

Read more

Collaboration with BatCAT project

Salim Belouettar, Peter Klein, and Natalia Konchakova have attended BatCAT project KoM to establish a collaboration with this ongoing project. The digitalization of materials, domain ontologies and interoperability of data sharing through digital platform are the collaboration topics.

BatCAT

Battery Cell Assembly Twin

MARCH

Industrial meeting

René Böttcher (AIRBUS) demonstrated the current stage of VIPCOAT OIP and discussed the scientific focus and challenges at AIRBUS focused meeting on March 08, 2024. Rene presented a talk titled "Computational Approaches for Surface Technology: RESPECT/ VIPCOAT" to the AIRBUS M&P Corrosion community. The team of the industrial partner provided KPIs and requests to facilitate the OIP use by industry.

© René Böttcher

Selection of Effective Corrosion Inhibitors for Aluminium Alloys based on Data-Driven Techniques

On March 13th, **Lisa Sahlmann** (Hereon) gave a talk for the SECOP and AIC3 groups at the University of Aveiro. In this presentation, the VIPCOAT platform was introduced, along with some details about how App1 can be used for the prediction of corrosion inhibitors.

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APRIL

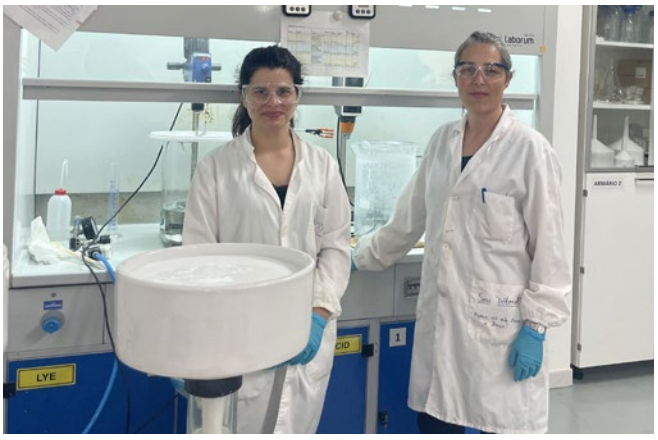
Time for experiments!

New coatings development and testing have been progressed by all partners involved in the experimental work: three companies, Smallmatek (SMT), AkzoNobel and AIRBUS, and two academia, TU Delft and Hereon. The partners have prepared a range of coatings to support the modelling activities for APP2 and validation activities in APP3 and APP4.

AkzoNobel has been preparing additional model coatings for early stage leaching experiments, microstructural characterization and incorporation of the best performing corrosion inhibitor -loaded LDH containers. The LDH nano-containers have been produced by **SMT**. The LDH containers were loaded in such a way that each coating had an equal molar loading of corrosion inhibitor at a Pigment Volume Concentration (PVC) of 30%. All samples were successfully prepared, applied and are currently in test.

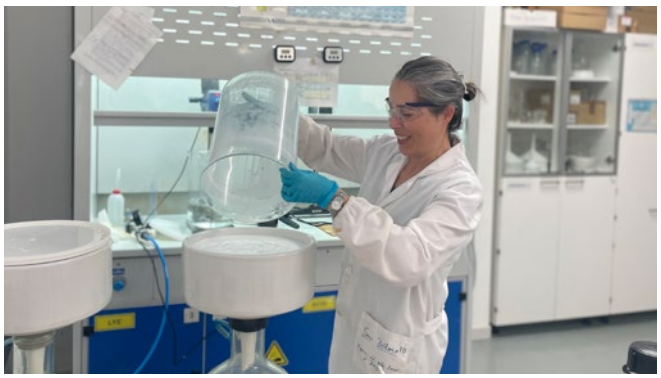
TU Delft has analysed the behaviour of corrosion inhibitors by first screening them according to their electrochemical performance. This laid the foundation for training a predictive machine learning algorithm that aims to discover the performance of new inhibitor candidates in-silico.

For the generation of data AIRBUS has conducted experiments to assess the



© VIPCOAT

Veronica Roque © VIPCOAT



Claudia Rocha © VIPCOAT

leaching performance from primers loaded with Lithium (Li) and Magnesium (Mg) and are evaluating the new coatings by standard cyclic corrosion tests.

Samples with a PVC of 30% and high thickness have been used. Among these there was a set of samples with topcoat, without topcoat as well as one without topcoat that has been sanded before the leaching experiment.

Hereon provided validation of modelling results using SVET electrochemical measurements. For these purposes the preparation of chromate-free industrially relevant samples was necessary. The samples produced for this work were supplied and treated by **AIRBUS** to aerospace standard and sent to **AkzoNobel** for coating application.

Intensive and effective collaboration of all partners will be reported in some scientific papers and contributions for **EUROCORR 2024**, which are currently under preparation for the publications.

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Acceleration of innovative protective coating design

On April 25th, **Lisa Sahlmann** gave a presentation "Acceleration of innovative protective coating design by machine learning: The VIPCOAT OIP approach" for the Committee on Materials Modelling, Simulation, and Data.

The talk particularly focused on the VIPCOAT platform, emphasizing its interoperability and providing details about selection of corrosion inhibitors (App1).

Surface Treatment of Light Metals

AIRBUS team of VIPCOAT project provided a presentation at the "Surface Treatment of Light Metals" technical committee meeting of DFO (German Research Association for Surface Treatment) on 23 April 2024 in Bremen. It was a joint meeting with the working group "Corrosion and corrosion protection of aluminium and magnesium" of the German society for corrosion protection (GfKORR).

Malte Burchardt (AIRBUS) presented results on "Chromate replacement and further requirements for corrosion testing - Modelling as an opportunity?". The talk provided a generic overview of VIPCOAT activities, focusing on materials modelling and characterization activity starting from selection of corrosion inhibitors (APP1) and finalizing by cyclic corrosion tests prediction (APP4).

Malte Burchardt

© VIPCOAT

MAY

ATOEC 2024

On May 28-31 scientists from academia and industry joined ATOEC 2024 to discuss challenges in surface science and electro-chemistry. The event was organized as the VIPCOAT related meeting in Egmond aan Zee, Netherlands. **Arjan Mol, Can Özkan, Mikhail Zheludkevich, Mats Meeusen, Herman Terryn** and **Peter Visser** contributed to the workshop presenting important scientific results.

Read more

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EMMC AGM 2024 & Collaboration Workshop

VIPCOAT consortium has been represented by **Lisa Sahlmann** at EMMC AGM in Cambridge on May 07-08.

Read more

© EMMC

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JUNE

IndTech 2024

The project coordinator attended **IndTech 2024 – Conference on Industrial Technologies**, in Namur, Belgium. INDTech 2024 is the European Union flagship event bringing together stakeholders from research organisations, industry, SMEs, and policymaking to discuss the state-of-the-art, technological challenges, as well as **future trends in the field of industrial technologies**. Natalia has been invited by the Belgian Government to contribute on June 3 to the session **Moving advanced materials design and development into the digital area** with a talk and a panel discussion. Networking and collaboration activity were an important part of the event. VIPCOAT met many ongoing projects representatives, industrial stakeholders, politician and European councils.

VIPCOAT meets MACRAMÉ at INDTech Conference 2024, Steffi Friedrichs (AcumenIST) (https://macrame-project.eu/)
© VIPCOAT

Read more

Escape 34- PSE 24

Results on Optimisation of a Production Chain for Active Corrosion Protection via Digitalisation have been presented by Peter Klein, Heinz A. Preisig and Natalia Konchakova at European Symposium on Computer Aided Process Engineering and International Symposium on Process Systems Engineering on June 5 in Florence.

Read more

MaterialsWeek 2024

On June 18-22, MaterilasWeek conference have brought together – for the first time – the numerous small and large Research and Innovation communities that are driving advances in materials innovation manifested across diverse value chains and industrial markets. By addressing all materials application sectors and R&I communities concerned with the (re-) discovery, identification, improvement, handling, processing, manufacturing, (re-) use and recycling of materials, MaterialsWeek 2024 provides a cross-disciplinary meeting venue for communication and collaboration over and beyond traditional community boundaries.

VIPCOAT project have been presented on June 18 by **Salim Belouettar** (LIST) at the session Market Needs, Challenges & Opportunities

Salim Belouettar © VIPCOAT

LATEST ACTIVITIES

for Materials R&I. Salim Belouettar reported on Enhancing Collaboration and Innovation through DigiPass-CSA and VIPCOAT Open Innovation Platform. **Natalia Konchakova** and **Peter Klein** have represented VIPCOAT consortium at the conference together with Salim. Peter and Natalia served the conference as the members of the organization committee.

Natalia was a member of the best poster award committee. The collaboration and networking with other ongoing European projects and initiatives have been successfully established and extended during the event.

Poster award committee work.
© VIPCOAT

Read more

Nanotexnology 2024

VIPCOAT OIP has been presented at the Nanotexnology 2024 conference in the frame of the Workshop on Open Innovation and Standardization for materials characterization, materials modelling and materials process and manufacturing.

Peter Klein (Fraunhofer ITWM) presented the lecture on Digitalizing Innovative Advanced Materials to enable collaboration along value chains on Open Innovation Platforms. An efficient and productive discussion with oip-sister projects -MUSICODE and OpenModel, has been provided. Some new ideas on the collaboration and futher platforms development have been discussion based on the workshop provided contributions from the OIP-projects.

Collaboration around VIPCOAT

Thomas Hagielen (SINTEF) demonstrated VIPCOAT OIP at an internal SINTEF conference focused on Ocean science on **June 25**. Future exploitation of VIPCOAT platform could be possible for Ocean relatet topics. Moreover functional coatings are extremely relevant subject for SINTEF Ocean. We are looking forward on the future deep collaboration and contribution to the platform use and extension for new application areas.

JULY

Scientific seminar

Marko Horvat (WIKKI) has presented VIPCOAT OIP and software engineering approached implements at the platform at a scientific seminar of Politechnico Turino, Italy on **July 4**. Marko discussed with young researches and PhD students potential of materials digitalization and benefits for society. Digital innovation platforms bring together stakeholders from different groups and communities, and connect industry, academia, governmental bodies and society to unlock the hided power of innovations, providing the real opportunity to drive an innovation process.

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Collaboration around VIPCOAT

On **July 24**, the project coordinator presented VIPCOAT platform functionalities at a scientific seminar of the SECOP's group of Aveiro University, Portugal. **Natalia Konchakova** (Hereon) gave a talk on "Digital Environment for Development of Advanced Materials" and presented two projects: VIPCOAT and DigiPass.

A strong scientific collaboration of VIPCOAT project partners **Smalmatek** and **Hereon** with University of Aveiro has been established many years ago in the frame of MUST EU-Project. The collaborative work provides a fruitful research with excellent result in the area of effective corrosion protection of materials surface.

EUROCORR Sponsor

VIPCOAT partners will contribute to EUROCORR both and the scientific community and as sponsors. Elsyca is one of the sponsors of the congress. The company will have a booth at the exhibition area of the conference.

Please read more about Elsyca's Exciting Journey with the VIPCOAT Project.

Bart Van den Bossche, Peter Meuris and Romain Baudson

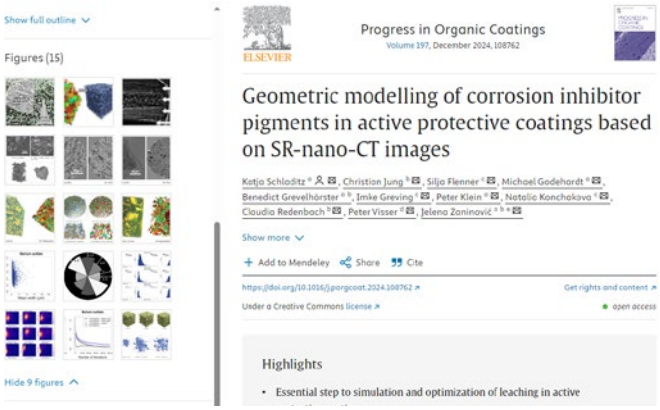
©Elsyca ©SINTEF

AUGUST

New scientific paper

Novel scientific results generated by VIPCOAT have been currently published by App2 team led by **Katja Schladitz** (Fraunhofer ITWM). The manuscript "Geometric modelling of corrosion inhibitor pigments in active protective coatings based on SR-nano-CT images" has been published in Progress in Organic Coatings: https://authors.elsevier.com/sd/article/S0300-9440(24)00554-X

The results was presented at EUROCORR-2024 on September 03 in Paris, France.



SEPTEMBER

EUROCORR 2024, September 1-5

EUROCORR is the main scientific event for the whole consortium to deliver the scientific progress in the active protection coating development and the OIP use. The consortium has delivered 10 scientific contributions for different sessions of the EURORR Congress 2024. We organized and let a Joining session and a Round Table on "Multi-scale

VIPCOAT Consortium at EUROCORR2024 © VIPCOAT

modelling for design of protective coatings" and collected ideas, requests and open questions from academia and industry on importend scientific challenged in corrosions science, technology and engeneering. The event attracted over 80 attendees. VIPCOAT consirium members contributed also activily to the business meeting of Working Party 22 "Corrosion Control in Aerospace".

16 scientists represented the consortium at the congress. They presented research achievements of the third year of the project.

Some new results have been mentioned in the plenary lecture "Machine learning assisted performance optimization of corrosion inhibitors and active protective coatings" given by **Arjan Mol**. The scientific contributions and achivements of VIPCOAT consortium was recognized by **Mikhail Zheludkevich** at Cavallaro Medal Lecture at EUROCORR2024 on September 1 in Paris, France.

Round Table discussion on September 3. © VIPCOAT

Arjan Mol © VIPCOAT

Theodor Hack, a member of the VIPCOAT consortium from 2021 till 2023, and an External Advisory Board member now, has received EFC Honorary Fellow Award. We warmly congratulate Theo on this award!

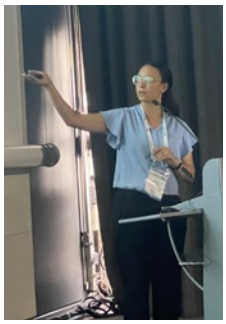
Theodor Hack © VIPCOAT

Great success and novel scientific results have been demonstrated by VIPCOAT project **partners at EUROCORR2024.**

Looking forward to delivering VIPCOAT final results to **EUROCORR2025, 7 - 11 September 2025** in Stavanger/Norway

Katja Schladitz

Heinz A. Preisig



Nourhan Abdelrahman

Malte Burchardt © all VIPCOAT

Mikhail Zheludkevich was honored in Paris.
© Hereon/ Mikhail Zheludkevich

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VIPCOAT

MEET THREE SMES BEHIND VIPCOAT

Bart Van den Bossche, Peter Meuris und Romain Baudson

Elsyca: Corrosion Modeling

Interview

Frederico Maia & Claudia Rocha

Smallmatek: Anticorrosion Additive Production

Interview

Hrvoje Jasak & Marko Horvat

WIKKI: Software Engineering

Interview

FOR PEOPLE AND THEIR FUTURE ENVIRONMENT

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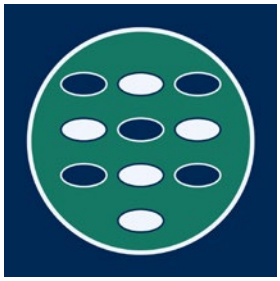
UPCOMING EVENTS

CONTRIBUTED & CO-ORGANIZED

cecam Centre Européen de Calcul Atomique et Moléculaire



January 27-30, 2025

CECAM Flagship Workshop

Workshop on Interfacial Properties: Open Questions (IPOQ)

CECAM-UK-DARESBURY

Find more

ORGANIZED BY VIPCOAT

Find more

Abbreviations:

OIP – Open Innovation Platform
OTEAPI – application programming interfaces (API) of OTE (Open Translation Environment)
BPMN – Business Process Model and Notation
DMN – Decision Model and Notation
LCA – Life Cyclic Analysis
CSA – Coordination and Support Action
EMCC – European Materials Characterisation Council
EMMC – European Materials Modelling Council

PARTNERS BEHIND VIPCOAT

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Do you want more information about VIPCOAT? ***Visit our website*** or check ***#VIPCOAT***