PROGRAMMA INTERREG V A Italia – Austria 2014-2020 Progetto ITAT1010 ICAP –



#### **WORKSHOP ON PVD:**

#### State of play and challenges ahead

<sup>&</sup>quot;Innovazione tramite applicazioni combinate delle tecnologie al plasma" -

<sup>&</sup>quot;Innovation durch kombinierte Anwendungen von Plasmatechnologien"

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"Innovazione tramite applicazioni combinate delle tecnologie al plasma"
"Innovation durch kombinierte Anwendunger

"Innovation durch kombinierte Anwendungen von Plasmatechnologien"

















#### Partner:



W3C - St. Veit:
 Wood Carinthian
 Competence Center
 Surface Technology & Logistics



Certottica – Longarone: Italian Institute for the certification of optical products.



#### Partner:



Consorzio Innova FVG Scientific and Technologic Park.



MCT – Material Center Tirol

Dept. of Innsbruck
University, Institute for
Construction and Materials
Technology



# Plasma: many technologies for surface treatments











### Different plasma technologies

- Plasma coating is used to produce high-quality tools and construction materials and for the surfacefinishing of plastics and textiles;
- Plasma cleaning and etching help to produce new generations of chips for high performance computers, to make energy-saving and environmentally friendly plasma lamps, to synthesise new materials with specially designed utility value, and to dispose of or recycle toxic substances and waste materials.



### ICAP Project: scopes

- Identification of the SME's needs of the program area
- Perform experimentations
- Dissemination, information and advertising of studies and results.



## Plasma technologies: we are still at the beginning of the story

- The many degrees of freedom in a plasma
- the large choice of process gases
- the huge number of adjustable parameters
- the innumerable possible reactor geometries

are the reason why product and process innovations cannot be achieved without a considerable effort in the form of research and development (R & D) work.



# Importance of plasma technologies

- Plasma technologies are technologies of the future, since can make an important contribution to sustainable growth, innovation, and new products.
- More and more products are appearing whose astonishing properties are born in plasma processes that selectively influence the molecular structure of the component material.



#### Plasma technology

Plasma technology is reflected in applications that are today already making our daily lives more convenient and healthier.







### The importance of surface treatments

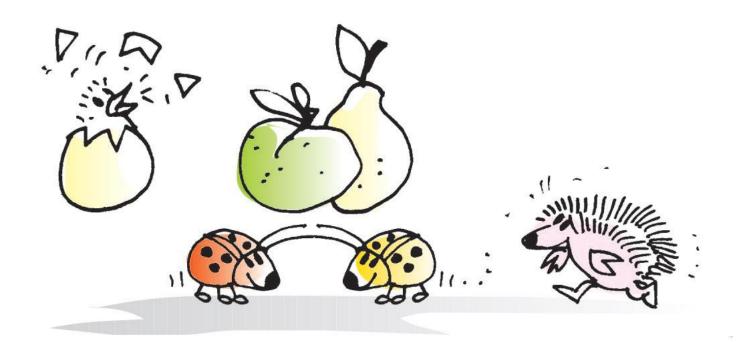
Surface treatments are important because enable to decorate, protect and give to the substrates the desired physical, chemical and mechanical properties:

plasma technologies allow to modify the surface characteristics with hi-tech and eco-friendly processes.



### Importance of surface

 Surface is representative of product properties: is content protection or protect from content.





# Surface can produce illusions or rejection

The appeal of an object is strongly conditioned by the appearance: a positive feeling brings us closer to the object while a repellent aspect leads us to refuse it.







#### Focus on PVD

Functional applications are not so much in evidence for the end users, but PVD applications play a central role in the innovations. For example in the engine and transmission for vehicles plasmahardened materials yield reduced friction in operation, thus improving the efficiency hence reducing fuel consumption.



#### Focus on PVD

There are important applications of PVD technology surface treatments in the medical and health sector: coatings, some consisting of bone-like ceramics, can be deposited to improve the rooting of the implant in the bone tissue.







#### Focus on PVD

PVD can provide both functional and aesthetical properties but there are limits concerning brightning and corrosion resistance.











#### **PVD** Applications



Scope of this workshop is monitoring the development of PVD applications to metal and plastic and to weigh up the situation.