UV MARKING Newsletter

Development of new UV laser for customization at industrial level through high quality marking on different materials (UV-Marking)

Project newsletter IIII

September 2014

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 314630

Programme area:	**FP7-2012-NMP-ICT-FoF** **Factories of the Future**
Coordinator:	**BSH ELECTRODOMÉSTICOS ESPAÑA S.A.** **Mr. Andrés Escartín** **Andres.Escartin@bshg.com** **Tel. +34 976 10 27 16**
Partners:	**ROFIN SINAR LASER GMBH (Germany)** **WIRTHWEIN AG (Germany)** **DATALASE (United Kingdom)** **ILVA GLASS SPA (Italy)** **TORRECID SA (Spain)** **UNIVERSIDAD DE ZARAGOZA (Spain)** **U-MARQ LIMITED (United Kingdom)**
Website:	**www.uv-marking.eu**
Duration:	**01/07/2012 – 30/06/2015**
Budget:	**€ 6.102.334 (EU contribution: € 3.657.000)**
Contract number:	**314630**

Project objective

The 3-year UV-Marking project has already covered 2 years of works. Very significant advances have been accomplished during these years, and therefore the consortium is optimistic about the project success.

The UV-Marking project was launched in July 2012 with the main objective of developing a new laser system in the ultraviolet wavelength used for high quality aesthetical marking in different materials (glass-ceramic, ceramic and plastics). It will demonstrate that unitary customization will be possible at the end of UV-Marking project. A new SW application will be developed so that real customers can create their own designs at home, and send them to the factory to be marked in real products. Industrialization is a must, and therefore laser system will be integrated into an industrial process to demonstrate its feasibility in a real scenario.

Project consortium

With the support of key worldwide companies and academic partners, UV-Marking project has a large reach network and strong exposure to relevant players and markets. It covers the whole value chain of UV-laser marking with high level experienced entities. The consortium gather the principal industrial actors involved in marking: final user (BSH), laser developer (ROFIN), material and additives developers (ILVA, TORRECID, WIRTHWEIN, DATALASE), research centres expert on both material and laser giving scientific knowledge of the laser-marking process (University of Zaragoza, ICMA), and a software developer expert on industrial integration software (U-Marq).

Expected impact

The success of UV-Marking project will provide UV-laser advantages for aesthetic marking into production of European key industries, by improving both materials and UV laser systems. The project results will introduce high flexibility as it will be possible to mark at the end of a process. This will reduce stock levels (of similar pieces only with aesthetic differences), increase marking options for customization, reduce time to market of new and modified products, improve quality, delivery time, etc.

Project Progress

After 27 months of project, its evolution is according to the initial planning, including the advances towards the project targets. Covering the different fields, very relevant achievements have been accomplished regarding the material development, both ceramics and plastics, and the laser development, with a new laboratory setup fulfilling all the expectations.

The interaction and collaboration among partners have been intensified, especially due to the completion of the first UV-laser lab setup which allowed the intensification of the parallel development of the material and the laser technologies. In addition, Integration and Industrialization has already started including the software definition and first development steps, and the first steps of the industrialization.

In relation to laser technologies development, the definition of the new laser system has been completed by Rofin, and the laboratory setup has been successfully completed. This new laser set-up represents the achievement of major targets established at the beginning of the project in relation to laser technologies development. Success emerges from the improvement of laser average power for the validated beam quality, and improving the laser properties for a more efficient material processing. Next steps planned for the following months are the construction of the final equipment prototype and its final characterization.

In relation to material development, very positive as well as optimistic results have been achieved. Regarding glass-ceramic material results during the first half of the project allowed selecting the right technologies and ways for achieving the project target. Therefore efforts were made by TORRECID and ICMA for improving the indirect marking technique showing excellent results. In addition, a new glass-ceramic material, NIG, was developed by ILVA. This new material covers the same requirements of the initial one, but reducing cost, increasing optical properties and showing new opportunities for the laser process.

In the field of ceramics main targets of cycle time reduction and colour decoration are advancing according to the schedule. Several material prototypes presenting the desired laser decoration properties and covering direct and indirect marking have been prepared.

In the field of plastics very promising results have been already achieved thanks to the

leadership of WIRTHWEIN and the participation of ICMA and DATALASE. With the current situation expectations for the end of the project are even higher than the initial ones, considering the risk and long development expected for these tasks.

As mentioned, integration and Industrialization works has already started. Leaded by U-MARQ task related to software development and integration definition are running according to the planning. As a continuation of these tasks BSH is starting to work on the future validation of final application.

In conclusion the UV-Marking project is now advancing according to the schedule, with minor delays in day a day work but not affecting the general project progress. Some of the project targets expected by the end are already achieved, such as cycle time reduction or color improvement on glass-ceramic, or development of a colour pigment technology for plastic marking. According to this, the consortium is fully committed with the success of the project.

One aspect to be highlighted is the great collaboration between the partners, showing the advantages of working together and in close cooperation. Below is shown a photo of the 5rd consortium meeting:

FIGURE 1: IMAGE OF THE 5TH CONSORTIUM MEETING. WIRTHWEIN FACILITIES

Due the significant advances recently accomplished, the consortium UV-Marking is now focused in project results dissemination, aiming to achieve the highest possible project impact and visibility. Main significant events are included in this newsletter.

"Materials Science and Engineering" MSE 2014, 25 September 2014, Darmstadt:

Since the first realization in the year 2008 in Nuremberg, the biennial international conference "Materials Science and Engineering" has not only steadily grown in the number of participants and contributions. Moreover, this event has developed such with respect to the width, the topicality and the scientific quality of the programme that it has to be considered truly a "must" for all materials scientists and engineers from both industry and science. Organized by Deutsche Gesellschaft für Materialkunde (German Materials Society).

Main aim of this congress is to enhance transferable competences between scientific community, specially focused in young researchers, and industrial partners in order to bring scientific knowledge to industry and to the market.

In this framework, UV-Marking project consortium participated in the congress as a good example of collaboration between well-known scientific and industrial partners with a common objective focused on market demands.

UV-Marking consortium took part in Session – **UV-Laser Processing (Topic: C Synthesis and Processing).** Mentioned session was composed by the following lectures:

- Laser, Plasmas and Hybrid Nano-Technologies for Surface Processing. UV-Laser Processing. (A.F. Lasagni, Fraunhofer Institut für Werkstoff- und Strahltechnik, Dresden (Germany))
- Lasers for Customization at Industrial Level through High Quality Marking on Different Materials. (A. Escartin (Sp), V. Gotor, F.J. Ester, BSH Home Appliances Spain, Zaragoza (Spain))
- UV Laser Aesthetic Marking on White Polymer Materials. (A. Söver (Sp), WIRTHWEIN AG, Creglingen (Germany); A. Escartin, BSH Electrodomesticos Espana, Zaragoza (Spain); P. Genter, ROFIN-SINAR LAser GmbH, Bergkirchen et al.)
- UV Laser for Micro- and Marking Applications (P. Genter (Sp), H. Diehl, S. Höfer, N. Kugler, U. Lehmann, A. Reiser, S. Riecke, D. Seitz, ROFIN-SINAR Laser GmbH, Bergkirchen; A. Escartin, BSH Electrodomesticos Espana, Zaragoza (Spain) et al.)
- High Speed Surface Patterning of DLC for Advanced Tribology and a Production Concept Design. (T. Roch (Sp), M. Beda, A.F. Lasagni, Fraunhofer Institute for Material and Beam Technology, Dresden (Germany))

FIGURE 2: UV-MARKING CONSORTIUM IN MSE 2014

The attendance to the congress was described as very successful by the UV-Marking consortium. The session has represented an excellent opportunity to:

- Offer academic sector a new view of industrial necessities and how collaboration is the solution to assure this approach.
- Exchange knowledge with other researchers specialized in this topics, who were very interested in the progress of the new laser.
- Establish new contacts and collaborative relations.

UV-Marking won "Best Poster_UNIVERSIA Price"

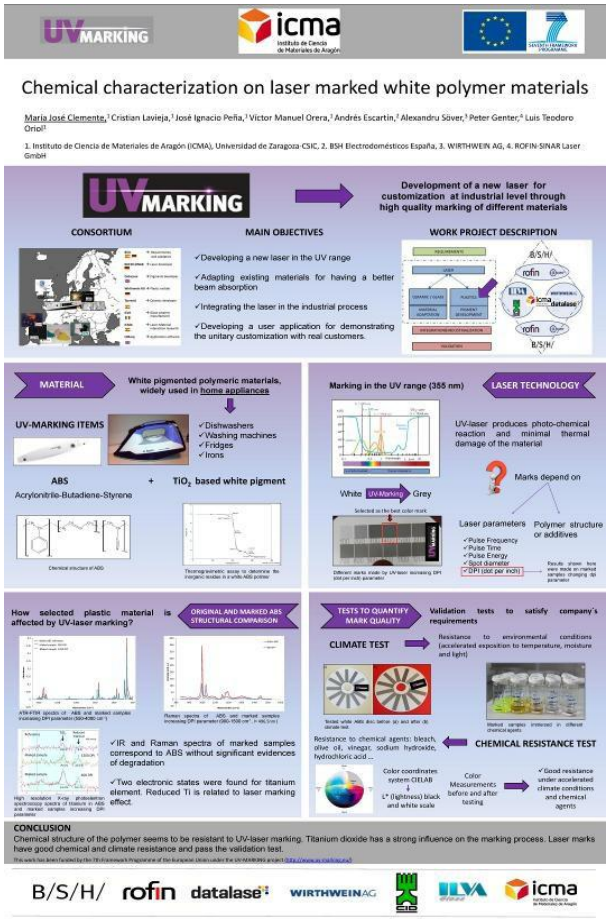

FIGURE 3: UV-MARKING POSTER

Consortium UV-Marking won "Best Poster_UNIVERSIA Price" published in SOCIEMAT publication nº27, Septemer 2014, with the Poster:

Chemical characterization on laser marked white polymer materials

María José Clemente,1 Cristian Lavieja,1 José Ignacio Peña,1 Víctor Manuel Orera,1 Andrés Escartín,2 Alexandru Söver,3 Peter Genter,4 Luis Teodoro Oriol1

1. Instituto de Ciencia de Materiales de Aragón (ICMA), Universidad de Zaragoza-CSIC, 2. BSH Electrodomésticos España, 3. WIRTHWEIN AG, 4. ROFIN-SINAR Laser GmbH