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Is it possible to overcome all the barriers to nanofluids market uptake?

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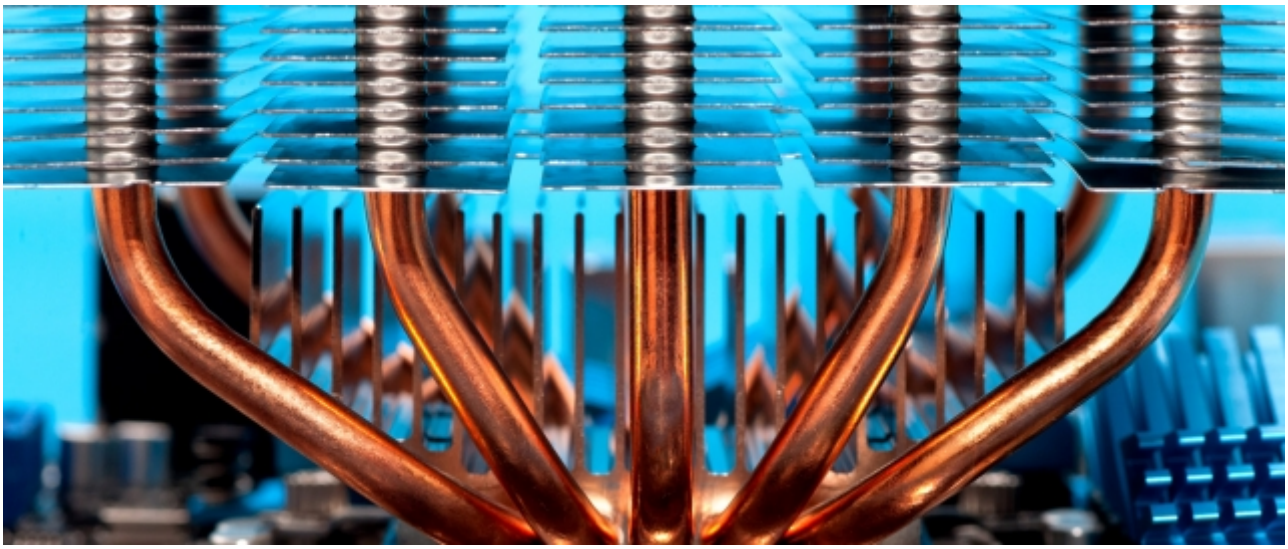
Overcoming Barriers to Nanofluids Market Uptake (COST Action CA15119) is creating a Europe-wide network of leading R+D+i institutions, and of key industries, to develop and foster the use of nanofluids as advanced heat transfer/thermal storage materials to increase the efficiency of heat exchange and storage systems.

By developing of nanofluids up to higher Technological Readiness Levels (TRL) and overcoming commercial application barriers, Nanouptake will contribute to achieve the European Horizon 2020 Energy and Climate ambitious objectives.

Nanofluids are defined as heat transfer or thermal energy storage fluids with enhanced heat transfer properties by the addition of nanoparticles. Despite the huge effort made in the research and development of nanofluids in the last decade, there are still significant barriers to their market uptake by commercial implementation in industrial applications. If these barriers are overcome, nanofluids will be an important player in the Value Added Materials (VAM) for the energy sector with a global-orientated market. "*One of the most important aspects during the design of a COST Action is the definition of its Working Groups as they will be the drivers of the work to be done in the next 4 years. During the planning of NANOUPTAKE we considered different options in this respect and finally, we decided to define the Working Groups by the types of industrial applications to which the nanofluids are directed (heating, cooling, storage and solar&boiling). In this way, the participants of NANOUPTAKE, especially those coming from Academia, were requested to think about the potential applications of their nanofluids from the very beginning since they have to be part of one of the Working Groups*" declares the Action Leader, professor Enrique Julia from Universitat Jaume I, Castellon, Spain.



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This is the first COST action on this topic and all activities are divided into 4 main research areas, that can be easily put together in order to overcome the barriers to market uptake: Working Group 1: NFs for heating applications; Working Group 2: NFs for cooling applications; Working Group 3: NFs for thermal storage applications; Working Group 4: NFs in boiling and solar applications.

Dr. Matthias Buschmann, from ILK Dresden gGmbH and coordinator for WG4 affirms that: "*WG#04 aims to bring researchers and engineers from the fields of boiling, solar application and modelling of nanofluid flow together. Main subjects are among others phase change close to the wall and formation of nonporous layers. Here the group focus on increase of critical heat flux and application in thermosyphons, heat pipes and similar devices. Modelling currently concentrates on numerical simulation employing single and two-phase approaches. During the first event of NANOUPTAKE in Castellon several paper presented results on optical qualities of nanofluids with carbon nanostructures*". Moreover, professor Sohel Murshed from University of Lisbon, Portugal, coordinator of WG2 states that "*Properly engineered nanofluids can be the game-changer for cooling technology*".

The Action started in April 2016 and managed to get attention from more than 32 Universities, 15 Research Centers and 12 End-users (manufacturers, companies dealing with heating fluids, solar applications etc) and about half of the 200 Action participants were early career investigators and members who developed strong relationships with SMEs in a market with such a great potential.

The COST Action identified, for the first time, the diverse range of stakeholders working in this area and set about developing a common language. Moreover, from its very beginning, Nanouptake accomplished a very large meeting in association with a Training School and another big event is foreseen for October 2017, preceded by

several working groups meetings and Short Term Scientific Missions.

"*We identified and invited all researchers and stakeholders working on nanofluids – mathematicians, physicists, engineers, and experts in nanofluids – to work with our multidisciplinary network*," says Prof. Alina Adriana Minea (Technical University "Gh. Asachi" from Iasi, Romania) who is the Dissemination Manager of the COST Action.

Bottom up, the Management Committee is tasked with providing a scientific, objective view of nanofluids manufacture and market uptake and its socio-economic effects.

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