Advanced organic compounds with enhanced thermal energy storage capacity

Areas: Chemistry, Energy, Biotechnology

Collaboration Opportunity: Available to license

Summary: A new technology has been jointly developed by chemistry and energy engineering researchers from DBA and GREA centers at the University of Lleida. This multi-application technology is based on **new phase change materials** (PCM) with higher thermal properties than those used nowadays. These compounds are **bisimidazole salts**, obtained from affordable natural sources - fats and oils, usually by-products at the agro-food industry - through a patented procedure.

Commercial Applications: Endless PCM applications exist for broad range of industrial applications. Used in **construction** materials, the compounds enhance comfort, reduce energy consumption and reduce air conditioning/cooling dependence; in the **health** sector are useful for safe transportation of temperature-sensitive pharmaceuticals, biologics and blood products; in the **textile industry**, advanced clothes or sport shoes to assure regular temperature; for **green energy**, to store energy in solar panels.

Competitive Advantages:

- ✓ **Renewable compounds** with ability to store and release large amounts of thermal energy
- ✓ **5-fold higher thermal energy storage capacity** when compared to marketed products (more than 200 KJ/Kg enthalpy of solidification)
- ✓ **Environmentally friendly** as they may be obtained from low-cost natural sources and/or industrial by-products (fats, oils, glycerol) by means of an **exclusive and patented procedure**.

Market: In 2013 the PCM market was quantified in 480.8 million $ and is expected to reach 1765.8 million in 2020 with an annual compound growth rate of 20,7%. The market can be segmented by three major product categories: paraffin (45%), hydrated salts (33%) and Bio PCM and fatty acids (22%).

Development status: Technology validated in lab (TLR4) obtaining bisimidazole salts from commercial precursors. Currently, by-products of the agro food industry are under investigation as natural sources to obtain the same compounds.

Intellectual Property:

1. Patent granted ES2611780B1 (priority date 10/11/2015)
2. PCT application PCT/ES2016/070790

Other related technologies protected:

3. Patent Granted ES2394244 (A1) (priority date 20/11/2012)
4. Patent Granted ES2345430 (A1) (priority date 17/11/2008)
5. Patent Granted ES2293836 (A1) (priority date 25/07/2006)