



**Production of ionic liquids, bisimidazolium salts obtained from glycerol and carboxylic acids, which show a high thermal energy storage (TES) capacity**



### BUSSINESS OPORTUNITY

Technology available for licensing

### IP STATUS

1. Spanish Patent granted  
ES2611780B1
2. European Patent filed

### TAGS

Organic Compounds, Bisimidazole Salts, Renewable Compounds, Thermal Energy Storage, Phase Change Materials (PCM)

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## ADVANCED ORGANIC COMPOUNDS WITH ENHANCED THERMAL ENERGY STORAGE CAPACITY

### THE TECHNOLOGY

Multi-application technology based on new phase change materials (PCM) with higher thermal properties than those used nowadays. These compounds are bisimidazolium salts, which may be obtained from affordable natural sources - fats and oils, usually by-products at the agro-food industry - through a patented procedure.

### THE 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%).

### 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**.

### 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.

### LEVEL OF DEVELOPMENT

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.