

INDUSTRIAL PROCESS FOR PRODUCING QUARTZ AND OTHER QUARTZ-CONTAINING RAW MATERIALS WITH REDUCED TOXICITY RELATED TO RESPIRABLE CRYSTALLINE SILICA (RCS)

DESCRIPTION OF THE TECHNOLOGY

Researchers at the Universitat Jaume I in Castelló and from the Fraunhofer ITEM in Germany have developed and patented a new industrial process for producing quartz and other raw materials that contain it, with a low respirable crystalline silica (SCR)-related toxicity. The invention, funded by the European Union through the LIFE Programme, consists in the dry processing of quartz, in which its particles are treated with a covering agent so as to reduce or eliminate the toxicity due to RCS. The main aim of this process is to improve the health conditions in certain work settings by curbing diseases that result from exposure to RCS.

Inhaling high concentrations of RCS for prolonged periods of time may result in the pathological reaction known as silicosis. In chronic cases, this may in turn lead to more severe diseases and even be the precursor for the development of tumours, which is a common problem in different industrial sectors around the world.

The International Agency for Research on Cancer has classified RCS present in work settings, in the form of quartz and cristobalite, as carcinogenic for humans (category 1). Quartz, in particular, is one

of the most widely used industrial raw materials because in most cases it cannot be replaced, due to technical or economic reasons, given its low price and the vast amounts that are consumed. In terms of exposure, RCS is probably one of the most widely extended chemical substances in Europe: millions of Europeans are exposed to it in their workplaces.

The process developed involves the use of small or low amounts of different covering agents, with or without a catalyst, so as to be able to select those that are best suited to processes in which quartz is used. By so doing, its behaviour as a raw material in industrial processes is not significantly modified and the quality of the end product is not affected.

Another stage in the processing of quartz powder is the covering process that is carried out on an industrial scale, which allows its direct use as a raw material in industrial processes in various sectors. The invention can easily be applied by raw materials processing companies, since the technology that has been developed can be implemented in their industrial processes in a relatively easy manner.

SECTORS FOR COMMERCIAL APPLICATION

The feasibility of this technology has been studied in a number of sectors such as ceramic frits, inorganic pigments, casting (moulds), adhesives for building materials and elastomers. In addition, the final product (treated quartz) could replace the quartz that is used as a raw material in various industrial sectors after studying the appropriate covering and the viability of the resulting quartz.

TECHNICAL ADVANTAGES AND COMMERCIAL BENEFITS

This technology, which results in quartz with low or no toxicity, therefore consists in replacing a toxic substance with another that is less toxic, which leads to the highest possible level of protection and consequently greater protection for workers. In the hierarchy of occupational risk prevention, the preferred option consists in replacing a pollutant at source.

The main advantages of this technology are:

- The resulting covered quartz is considerably less toxic than the original.
- The utilisation of the treated quartz does not suppose changes in the processes of production neither in the products.
- It allows the covering agent to be applied directly onto a dry surface on an industrial scale.

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STAGE OF DEVELOPMENT OF THE TECHNOLOGY

Industrial prototype. Industrial tests are being conducted to check its validation; expected end date: October 2019.

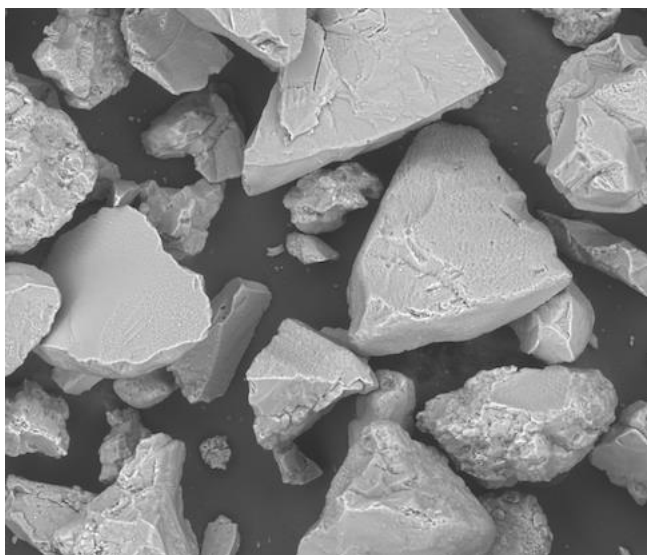
INDUSTRIAL AND INTELLECTUAL PROPERTY RIGHTS

This invention is protected by means of a European patent with reference number EP19382177.4, which was filed on 11/03/2019.

COLLABORATION SOUGHT

Development and adaptation of the technology to particular applications through specific agreements and a subsequent licensing agreement.

RELATED IMAGES



This work was conducted in the frame of the project LIFE14 ENV/ES/000238 SILIFE - "Production of quartz powders with reduced crystalline silica toxicity", which is co-funded by the European Commission Programme Environment and Resource Efficiency.

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