

# Research centre ensures glass industry is booming in Brazil

Edgar Dutra Zanotto and Hellmut Eckert\* discuss the recently opened Center for Research, Technology and Education in Vitreous Materials (CeRTEV), in São Paulo, Brazil.

**G**lass products are part of a multibillion national and international market. The sector is dominated by large global companies, but there are also thousands of small and medium-sized glass producers.

The overall flat glass market is estimated to be €51 billion, and in 2009, Europe, North America & Mexico, and China accounted for 70% of world float/sheet glass demand. In the same year, South America consumed only 4% of the flat glass produced worldwide.

However, this is changing, as Brazil becomes an international industrial player. Since 2007 several float glass companies have built new plants in the country, and the installed capacity will soon rise from 3kton/day to almost 8kton/day, increasing the demand for engineering solutions and qualified human resources in this particular area.

Besides windows, classical established glass applications comprise containers, light bulbs, kitchenware, labware, mirrors and lenses for optical devices, fibres for reinforcement and optical communication and ceramic tiles.

In addition, oxide glasses and glass-ceramics (GCs) can be found in other less obvious applications, such as dental materials; bioactive materials for bone substitution and skin healing; interfacial material for abrasive wheels and electronic devices; engineered proppants for stuffing hydro-fractured oil wells; high-strength touch screens and thin films for sensors.

The success of these high-tech industries is based on the multitude of opportunities for tailoring the physical properties of glass to the particular

application considered. Therefore, the development of glass and glass-ceramic compositions and technologies is an enormously active area for R&D.

An indication of the scientific and commercial importance of glass-ceramics comes from a search on Free-patents Online. About 2,400 granted or filed US patents appear with the keywords 'glass-ceramic' in the abstract.

There are also about 1,500 European and 2,700 Japanese patents. We also performed a parallel search of the patent literature using the Derwent Innovations Index (Thomson Reuters Scientific). This search covered patents granted between 1963 and 2013 using the keywords (glass\* or amorphous or vitreous or non-crystalline) in the patent titles. This search resulted in about 370,000 patents issued worldwide [1]. These are impressive numbers for a single field within all the numerous materials classes and types.

## CeRTEV

The Center for Research, Technology and Education in Vitreous Materials (CeRTEV) began its operations in July 2013 with generous funding by FAPESP (The São Paulo State Research Foundation in Brazil).

Following a two year competition process that initially had 90 proposals, FAPESP awarded funds to a total of 17 new research centres in various strategic research areas deemed particularly important for the Brazilian economy, and supported by research expertise at the applicant institutions.

CeRTEV is an 11-year, US\$22 million (excluding salaries) effort with funding at about US\$2 million per year for five years, after which FAPESP will evaluate the programme before authorising funding for the next six years.

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