

Editorial corner – a personal view

Plastics' key role in energy-efficient building

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Plastics-based solutions are widespread in the building industry, as the benefits they brought are multiple: insulation, protection from wind and weather, easy refurbishment, attractive new design or efficient energy management.

Plastic pipes for heating and water have proved to be superior to conventional piping systems (more flexible, rust-free, anti-scale deposits, etc.) for a long time. Window frame profiles made of polyvinyl chloride (PVC), one of the most widely used plastic in building industry, provide better thermal insulation, making them suitable for use in passive houses as the energy consumption is reduced dramatically. Other polymer systems may also improve energy management for façades, walls and roofs. Composites or sandwich elements made of expanded polystyrene (EPS) filled with graphite particles or polyurethane (PU) rigid foams are used on walls or on roofs, as well as below the ceiling to provide climatic regulation. The surface of front doors, window frames and façades can be coated with UV-resistant acrylonitrile styrene acrylate (ASA) films so as to guarantee long-term protection against weathering. Roof glazing with thermal protection made of polymethyl methacrylate (PMMA) or polycarbonate (PC) multi-wall sheets enables interior spaces to stay pleasantly cool without having to dispense with daylight, and reduces the cost for heating and cooling.

Moreover, as the solar heating market is steadily growing, the very promising field of large area, light-weight organic photovoltaic panels has

emerged for plastics. Polyvinyl fluoride (PVF) films have been used successfully for the backsheet of photovoltaic modules thanks to their weather and UV-resistance, and high barrier properties against moisture. Light-resistant thermoplastic polyurethanes (TPU) are expected to permit to switch from batch-manufacturing to continuous production, lowering expenses accordingly. Furthermore, new efficient manufacturing methods for large-surface modules on flexible low-cost substrates are under development. Finally, intensive research efforts are currently going on into semi-conducting organic materials with high thermal and photochemical resistance, which are intended to replace today's silicon, whereby they absorb sunlight and convert it into electric power.

At last, organic Phase Change Materials (PCM) such as HDPE or paraffin compounds provide a new horizon for passive thermal energy storage in bioclimatic architecture, and will contribute to make buildings even more energy-efficient in the future.



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