FLAME RETARDENT MATERIALS FOR LASER SINTERING

Halogenated or none refreshable flame retardant laser sintering materials are state of the art. Those material have the drawback of hazardous or sustainability issues, which often prevent a successful business case. The overall objective is the deployment of a flame retardant laser sintering material that does not contain halogens and still allows a proper recycling rate for sustainable and cost efficient applications. For this purpose, the ageing mechanisms preventing the recycling of currently available halogen-free flame retardant materials will be done. In Addition, a screening of different flame retardants shall lay down the foundations for an actual material development in a follow-up project.

FIGURE 1: Aircraft Drain Elbow

Motivation

Laser sintering is becoming increasingly attractive for the direct production of functional end user products. Some industries such as aviation or medical require flame retardant properties of polymer parts for example an UL94 V0 certification, as the parts are located in public accessable areas where harzouse gases and smoke. Therefore, SLS materials with flame retardant properties are required.

Some flame retardant SLS powders are commercially available, however there are two major issues. Either these powders contain halogenated flame retardants or the powder cannot be recycled.

The problem with halogenated flame retardants is their hazardous properties for health as well as their high persistence and accumulation in the environment. Some flame retardants cause corrosive or highly toxic fire gases or fire-by-products. For this reason, the use of most halogenated flame retardants is prohibited by the RoHS-directive and many manufactures banned the usage of all halogenated flame retardants inside their products.

The 0% refreshment rate means, that the used powder must be thrown away, resulting in a sustainability and cost problem, which leads most often to a rejection of a potential business case.

Aim

The overall objective is the deployment of a flame retardant laser sintering material that does not contain halogens and still allows a proper recycling rate for sustainable and cost efficient applications. Within the framework of this project, the foundations are to be laid to enable the actual material in a follow-up project. For this purpose, a screening of different flame retardants will be done and in addition it will be investigated which ageing mechanisms prevent the recycling of currently available halogen-free flame retardant materials.

PROJECT OVERVIEW

DURATION	03/2022 – 10/2022
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