Replacement of gypsum plasterboard with sustainable secondary raw material composition

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Abstract

Climate change and the efforts of states to significantly reduce CO2 emissions require considerable efforts in the construction industry. Interior components in particular offer the potential to test new building materials. Gypsum is an essential finishing material, especially in the form of plasterboard. Due to the German cut of coal-fired plants, around 5 million tons of gypsum will be missing from 2038. It is therefore urgent to replace the loss of FGD gypsum by alternative products with similar mechanical properties, that can be produced at similar cost and in an adequate volume worldwide. In addition, however, these building materials must also be compostable, non-toxic and meet sustainability criteria. The paper describes approaches for substitute

Keywords: secondary raw materials, replacement materials, sustainability, gypsum, plasterboard.

1 Introduction

Climate change and the efforts of states to significantly reduce CO2 emissions require considerable efforts in the construction industry. In general, about a third of CO2 emissions can be attributed to the construction sector.

Interior components in particular offer the potential to test new building materials due to the low requirements for building law, statics and building physics.

Gypsum is an essential finishing material, especially in the form of plasterboard.

More than 50% of the gypsum available on the German market is FGD gypsum. This is a cheap by-product during the flue gas desulfurization of exhaust gases from coal-fired power plants.

Due to the German cut of coal-fired plants, around 5 million tons of gypsum will be missing from 2038. This results in a clear deficit in the raw material availability of gypsum and the building products obtained from it, such as plaster boards, gypsum plaster, gypsum blocks. Even an increasing production of natural gypsum cannot replace the missing FGD gypsum.

It is therefore urgent to replace the loss of FGD gypsum by alternative products with similar mechanical properties, that can be produced at similar cost and in an adequate volume worldwide. In addition, however, these building materials must also be compostable, non-toxic and meet sustainability criteria. This is a major and responsible task in the construction industry.

2 Recycling of building materials

2.1 Recycling

Recycling means of converting waste materials into new materials and objects. This concept often includes the recovery of energy from waste materials. The recyclability of a material depends on its ability to reacquire the properties it had in its original state. It is an alternative to waste disposal that can save material consumption and help reducing greenhouse gas emissions. It can also

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