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# News Strategies for sustainable use of waste arising from foundry industry: Production of new ceramic material for water treatment

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## PURPOSE OF THE ABSTRACT

One of the great problems in the science and engineering, it is a development of sustainable materials, which are produce by a chemically green rout. In this sense, use of waste arising from foundry industry is a great opportunity to resolve a environmental problem and to provide sustainable economy. Moreover, these waste arising are an incredible healthy human problem, as some of them causes terrible problem, as silicosis. This disease cause by silicon provokes a degradation of lung that can not be resolved. In addition, this waste may discharge in the air or groundwater extending the problem not only to direct workers in the industries that produce this waste, but to the population in the vicinity. In this context, this research produced a new ceramic material based on residues from the silicon industry (MS), from a steel mill in the northern region of Minas Gerais, and aluminous cement (CA) for application in water treatment. The samples were produced at different concentrations (CA/MS 90/10, 70/30 and 50/50) and different times (5, 12 and 24 hours) at 1100 ° C. SEM, EDS, DRX, FTIR, XPS, micro-CT were used to characterize the samples. Furthermore, the adsorption of glyphosate in water was evaluated. The results showed that the high concentration of residues in the ceramic material provided an increase in the porosity of the new ceramic material due to the chemical reactions between calcium aluminate and silica producing a new chemical structure. In addition, the SEM showed that the differences in morphology between the aluminous cement and the resulting residues determined the results of the samples, especially when the concentration of residues originating increased. Moreover, the XRD confirmed the structural modification and production of new ceramic material. As the adsorption of glyphosate presented an incredible result. Thus, the results showed the possibility of using this residue that emerged as a potential new ceramic material for water treatment, and as an alternative to the environmental problems caused by the foundry industry.

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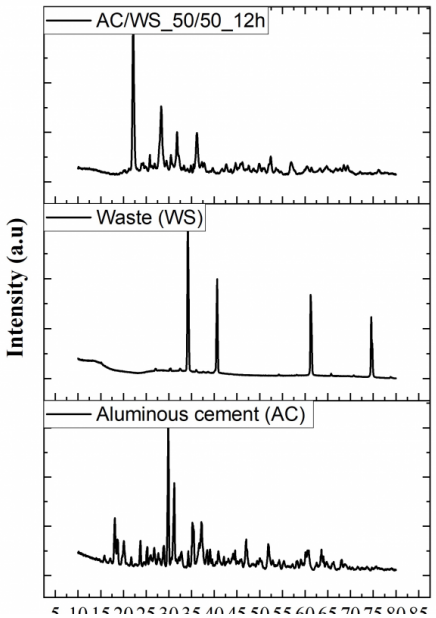
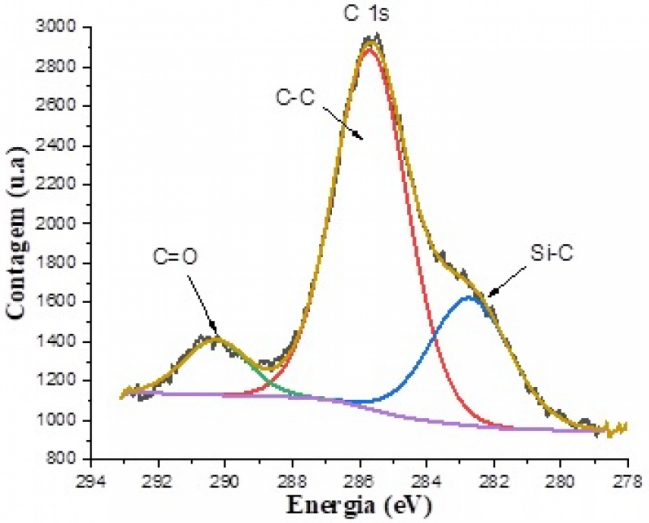
## FIGURES




### FIGURE 1

Fig 1.1

Comparative XRD of (a) Aluminous cement (AC), (b) Waste (WS) and (c) AC/WS 50/50 12 hour of sintering at 1100°C

### FIGURE 2

Fig. 1.2

XPS of aluminous cement pure before sintering with waste


## KEYWORDS

silicon | green chemistry | new material | adsorption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