

Book of Abstracts

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Selfextinguishing epoxy nanocomposites containing coffee biochar and other additives

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To counter the depletion of phosphorus and reduce the flammability of epoxy-based composites, the scientific community is fostering the reuse of biowastes as flame retardant additives. Among the biowastes released by the food industry, spent coffee grounds (SCGs) is one of the most abundant (~6 million tons/year). The pyrolysis of SCGs gives a biochar showing high thermal stability and amphiphilic character¹. Herein, the epoxy matrix was modified by a coupling agent to obtain polar nano-environments and thus a better dispersion of the coffee biochar through the silanized resin². Sol-gel chemistry was applied to synthesize a new ternary Si-Ti-Mg oxide by a sustainable approach. The ternary oxide was employed together with coffee biochar and ammonium polyphosphate to manufacture no dripping selfextinguishing (UL94-V0) nanocomposites, even with a very low content of phosphorus (1 wt.%). Interestingly, the chemical composition of the ternary oxide also guaranteed a decrease (~11%) in the smoke production of the final products.

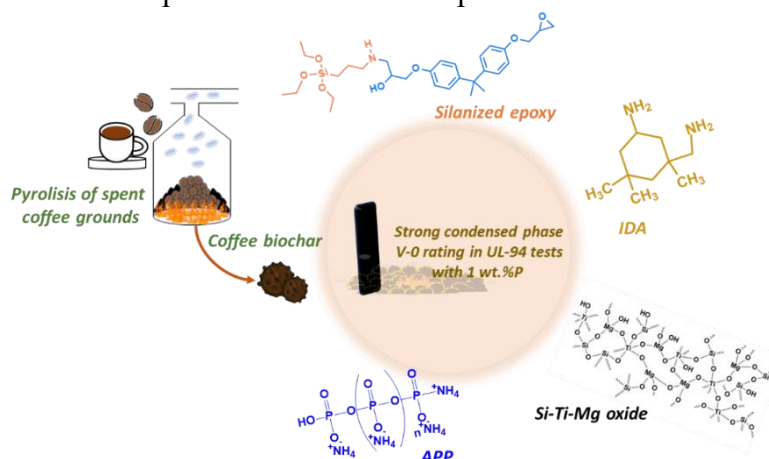


Figure 1. Selfextinguishing epoxy nanocomposites containing coffee biochar, APP and ternary oxide.

References

¹ M. Giorcelli, M. Bartoli *Polymers* **2019**, *11*, 1916.

² A. Bifulco, M. Bartoli, I. Climaco, M.C. Franchino, D. Battegazzore, D. Mensah, O. Das, H. Vahabi, G. Malucelli, A. Aronne *Sustainable Materials and Technologies* **2024**, *41*, e01079