WOOD – CERAMIC COMPOSITES: SYNTHESIS AND ANALYSIS OF $GdPO_4 \cdot H_2O$:Eu MODIFIED WOOD

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Due to high sustainability, thermal and electrical insulating properties, and aesthetics, wood is the most abundant building material used in residential and non-residential buildings, furniture constructions, and decoration. Thus, high weathering, biological and pyrolytic resistance of wood is essential.

Mechanical, biological, thermal, and accelerated weathering behaviors of wood can be increased using various materials. Usually, organic compounds (phosphorus-based, phosphorus-nitrogen, phosphorus-halogen compounds) are used to impregnate the wood. Also, high resistance can be reached preparing wood – polymer composites (WPC) – polymeric agents graft onto the surface of the cell walls or cell lumen, creates a protective coating. Acetylation and in situ polymerization in wood‘s matrix are two major chemical modifications used to produce WPC. Nevertheless, growing awareness of the toxicity of such compounds leads to further investigation of new materials, systems, and methods that could improve wood‘s characteristics. Therefore, this work proposes inorganic $GdPO_4 \cdot H_2O$:Eu compound produced by in situ hydrothermal syntheses in wood’s matrix as an alternative material increasing wood’s chemical resistance.

After in situ synthesis, the characteristics of the samples were observed by scanning electron microscopy (SEM) and computed tomography (CT) (Fig.1); optical properties were determined by luminescence analysis. Thermogravimetric (TG) analysis was performed to attest the effects of $GdPO_4$ on the thermal degradation of wood.

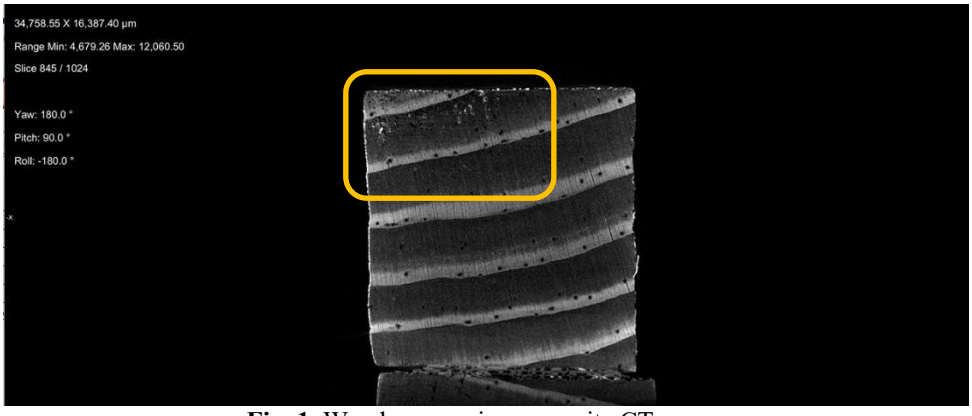

Fig. 1. Wood – ceramic composite CT

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