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[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[PDF \(764K\)\]](#) [\[References\]](#)

Effects of Fire Retardant Chemicals and Retention on Heat Release Rate of Wood

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Abstract: Heat release of interior materials is an important fire property which influences propagation and enlargement of room fires. In this study, nine kinds of fire retardant chemicals were impregnated into 15 mm thick specimens of sugi (*Cryptomeria Japonica* D. Don) and yachidamo (*Fraxinus mandshurica* Rupr. var. *japonica* Maxim.) at various concentrations, and heat release performance was tested by the cone calorimeter test at an irradiance of 50 kW/m². The chemicals used for treatment have been widely used in fire-retardant treated wood materials. The maximum heat release rate and the total heat release were reduced with increasing amounts of chemicals. The effect of decreasing total heat release was in the following order ; guanidine phosphate, ammonium dihydrogenphosphate, diammonium hydrogenphosphate>diguanidine phosphate>guanylurea phosphate>boric acid, ammonium borate, sodium octaborate>ammonium sulfate. Phosphorus compound decreased flaming remarkably, but glowing was difficult to control.

Keywords: heat release, phosphorus compound, boron compound, cone calorimeter, fire retardant

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