

Abstract

# Wood Protective Coatings Prepared with Silanes Based on Fatty Acids †

Karol Szubert

Faculty of Chemistry, Adam Mickiewicz University in Poznań, 61-712 Poznań, Poland;  
karol.szubert@amu.edu.pl

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**Abstract:** Wood is one of the most important materials in the construction industry. Because of its organic constitution, it is slowly destroyed by the long-term impacts of water, oxygen and light under atmospheric conditions and, hence, needs to be sufficiently protected. Appropriate protection of wood leads to it having longer life and, hence, a huge reduction in maintenance costs. There are several methods to protect wood, either by its chemical modification or by its surface treatment. Unfortunately, many of the wood preservatives that have been used so far are highly toxic to humans and, hence, much attention has been paid to the development of nontoxic materials/methods for the protection of wood. Recently, several reports have been published on the use of inorganic–organic hybrid coatings for the protection of wood substrates. The sol–gel process to generate hybrid coatings is quite versatile and even allows room temperature deposition of hybrid inorganic–organic films on a wide range of substrates, including wood. Wood surface modification with multifunctional alkoxy silanes by the sol–gel process is one promising method to improve and provide new properties for wood materials. The advantage of the sol–gel process is that it allows deposition of a thin inorganic–organic layer on various substrates as a result of controlled hydrolysis and polycondensation of alkoxy silanes. The sol–gel coatings created on the wood surface provide barrier properties, moisture control and repellency properties. In this communication we present new trialkoxy silanes synthesised from fatty acid derivatives and their application in wood protective coatings.

**Keywords:** renewable resources; fatty acid derivatives; sol–gel processes; organically modified silanes; wood protection

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## References

1. Lambourne, R.; Strivens, T.A. (Eds.) *Paint and Surface Coatings. Theory and Practice*; Woodhead Publishing: Cambridge, UK, 1999.
2. Hill, C. *Wood Modification Chemical, Thermal and Other Processes*; Wiley: Hoboken, NJ, USA, 2006.
3. Materne, T.; de Buyl, F.; Witucki, G.L. *Organosilane Technology in Coating Applications: Review and Perspectives*; Dow Corning Corporation: Midland, MI, USA, 2012.
4. Mai, C.; Militz, H. Modification of wood with silicon compounds. Treatment systems based on organic silicon compounds—A review. *Wood Sci. Technol.* **2004**, *37*, 453–461.
5. Arkles, B. *Silane Coupling Agents*; Gelest, Inc.: Morrisville, PA, USA, 2014.



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