Abstract

Hyperbranched poly(amidoamine)s (PAMAMs), exhibiting various levels of hydrophilicity, were used as modifiers for melamine urea formaldehyde (MUF) adhesives. The modification was achieved either with or at expense of sodium hydroxide during the last pH adjustment. Their apparent co-condensability was expected from the measured gel times and further proved using Fourier transform infrared (FTIR) spectroscopy as well as C-13 nuclear magnetic resonance (C-13 NMR). Utilization of these structures as modifiers for MUF, which are frequently used in particleboards production, resulted in manifold advantages. Considering the economic point of view, their use is more practical and cheaper with respect to dendritic structures. Additionally, their application in finite quantities as final additives, either immediately before the final use or at the last stage of preparation, yielded considerable upgrading of the dry internal bond (IB) strength of the produced particleboards. The improvement was extended to the resistivity to hydrolytic degradation as revealed by the wet IB strength and thickness swelling. The results were explained on the light of an extensive investigation on the resins using thermomechanical analysis (TMA) while taking into account the relevant hydrophilicity and degree of branching of each hyperbranched structure.