SEC-MALS\textsubscript{785nm} for absolute molar mass measurements of technical lignins

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The molar mass distribution of technical lignins is a key parameter for the characterization of this abundant but thus far under-utilized biopolymer. The road to lignin utilization is closely connected to the ability to comprehensively and reliably analyse lignin. In the past, attempts to characterize technical lignin by light scattering with or without SEC-hyphenation have often failed. The classic SEC approach widely applied in lignin analysis is typically based on calibration with non-lignin standards. Several systems are available for SEC studies of lignins, including speed versions that apply Advanced Polymer Chromatography (APC) in the solvent system DMSO/LiBr of underivatized lignins \[1\]. The application of MALS as an absolute detection system for lignin molar mass, previously thwarted by lignin fluorescence and adsorption issues, was finally enabled with the advent of lasers in the infrared range. These lasers considerably reduce problems with the fluorescence of technical lignins, in particular those resulting from the Kraft process \[2\]. Also absorption of lignin samples interferes with a reliable measurement. Such effects are corrected with the laser forward monitor (FM). An extrapolation from high molar mass regions, which are less affected by fluorescence and absorption, to lower molar mass regions gives further improvement. We suggest this triple combination of IR laser usage, absorption correction through the laser FM and extrapolation improvement of low-molecular weight regions as the standard tool for accurate molar mass characterization of technical lignins, especially today, with the interest in lignin utilization skyrocketing.

References
