



**Figure S1.** Test cloud plot of metabolite features, the level of which varies significantly ( $p < 0.01$ ) between pyrolytic lignins derived from fast pyrolysis. The metabolite features are represented by bubbles on the cloud plot depending upon their retention time ( $x$ -axis) and  $m/z$  ( $y$ -axis). Each bubble represents a metabolite feature, where the size of the bubble denotes its intensity, and the colour of each bubble (from light blue to dark grey), indicates its statistical significance ( $p < 0.01$ ).