

SOME STRUCTURAL CHARACTERISTICS OF AUSTRALIAN COALS. R. B. Johns, T. V. Verheyen,
Chemistry School, University of Melbourne, Australia.

Victorian brown coal occurs in five lithotypes. Pyrolysis-MS groups them into two sets, the resinous content distinguishing the darker from the lighter lithotypes. Chemically they vary between seams (the oldest being the most aliphatic), but the same chemical trends are shown within each lithotype profile. Even though seams differ and aromaticities by solid state ^{13}C nmr can differ, IR spectral subtraction routines between lithotypes confirm the correlation between loss of carbonyl absorption and loss of aliphatic absorption. Humic acids fractionated from an aliphatic south Australian lignite qualitatively are similar in aliphatic components, but the most soluble humic acid in the profile is also the most aliphatic and is dominated by long chain structures. These aliphatic residues are bonded into this humic acid fraction. The light, in contrast to the dark lithotypes, show more degraded lignin phenolic components, consistent with gelification in chemical terms, but at variance with petrographic assessments. The aromatic residues are chemically involved in upgrading reactions of brown coals to technologically valuable low-moisture-content fuels. The chemistry of the lithotype and seam dependence of the upgrading procedures will be discussed.