

## 引用文献

1. Adler, E (1977) Lignin Chemistry—past, present and future. *Wood Sci Technol*, 11: 169-218
2. 細谷修二 (1992)ケミカルパルプの無塩素漂白—リグニンの反応化学からみた現状と今後の方向—。紙パ技協誌, 46(11): 2-19
3. Froass, PM, Regauskas, AJ, Jiang, J-e (1996) Chemical Structure of Residual Lignin from Kraft Pulp. *J Wood Chem Technol*, 16(4): 347-365
4. Yamasaki, T, Hosoya, S, Chen, CL, Gratzl, JS, Chang HM (1981) Characterization of Residual Lignin in Kraft Pulp. *Proc 1<sup>st</sup> ISWPC, Stockholm, Jun 9-12, Vol. 2, p. 34-42*
5. Taneda H, Hosoya S, Chang HM (1987) Stability of  $\alpha$ -Ether Type Model Compounds during Chemical Pulping Process. *J Wood Chem Technol* 7(4): 485-498.
6. Hosoya, S, Taneda, H, Chang, HM (1989) Formations and Reactions of Ether-Type Lignin Carbohydrate Complex. *Proc 5<sup>th</sup> ISWPC, Raleigh, May 22-25, p.69-73*
7. Hosoya, S, Shimada, K, Taneda, H, Chang, HM (1991) Behavior of Pulping-Resistant Structures in Lignin During Bleaching. *Proc 6<sup>th</sup> ISWPC, Melbourne, Vol. 1, p.563-569*
8. 中野準三、石川久雄 (1990) 第 10 章 蒸解及び漂白中のリグニンの反応: リグニンの化学—基礎と応用—(増補改訂版)、ユニ出版株式会社、pp.238-302
9. 榊原彰(1990)第6章分解反応:リグニンの化学—基礎と応用—(増補改訂版)、ユニ出版株式会社、pp.113-122
10. Jiang Z-H, van Lierop B, Berry R (2000) Hexenuronic Acid Groups in Pulping and Bleaching Chemistry. *Tappi J* 83(1): 167-175
11. Shimada K, Hosoya S, Ikeda T (1997) Condensation Reaction of Softwood and Hardwood Lignin Model Compounds Under Organic Acid Cooking Condition. *J Wood Chem Technol* 17(1): 57-62
12. Yasuda S, Ota K, Hirano T (1986) Chemical Structures of Hydrochloric Acid Lignin III. Reaction of phenylcoumaran with hydrochloric acid. *Mokuzai Gakkaishi* 32(11): 915-920
13. Yasuda S, Terashima N, Kaneko H (1982) Chemical Structures of Hydrochloric Acid Lignin II. Reaction of arylglycerol- $\beta$ -aryl ether with hydrochloric acid. *Mokuzai Gakkaishi* 28(9): 570-576

14. Ito T, Terashima N, Yasuda S (1981) Chemical Structures of Sulfuric Acid Lignin III. Reaction of arylglycerol- $\beta$ -aryl ether with five percent sulfuric acid. *Mokuzai Gakkaishi* 27(6): 484-490
15. Yasuda S, Adachi K, Terashima N, Ota K (1985) Chemical Structures of Sulfuric Acid Lignin VIII. Reaction of 1,2-diaryl-1,3-propanediol and pinosresinol with sulfuric acid. *Mokuzai Gakkaishi*, 31(2): 125-131
16. Hosoya S, Tomimura Y, Shimada K (1993) Acid Treatment as One Stage of Non-Chlorine Bleaching. The 7<sup>th</sup> ISWPC, Beijing, May 25-28, Vol. 1: 206-213
17. Gierer J (1990) Basic Principle of Bleaching Part 1. Cationic and radical processes. *Holzforschung* 44(5): 387-394
18. 池田努 (1998) 第 5 章オゾン漂白:筑波大学博士(農学)論文クラフトパルプの無塩素漂白に関する研究: pp.54
19. Abrahamsson K, Löwendahl L, Samuelson O (1981) Pretreatment of Kraft Pulp with Nitrogen Dioxide before Oxygen Bleaching. *Svensk Papperstidn* 84: R152-R158.
20. Samuelson O, Sjöberg LA (1982) Alkaline Delignification of Kraft Pulp after NO<sub>2</sub>/O<sub>2</sub>Pretreatment. *Svensk Papperstidn* 85: R69-R72
21. Samuelson O, Sjöberg L-A (1984) Influence of Nitrate and Nitric Acid on the Pretreatment of Kraft Pulp with Nitrogen Dioxide and Oxygen., *Svensk Papperstidn* 87:R30-R35
22. 川上千明, Pikka, O(2000)アールストロームの MC オゾン漂白技術-ECF への応用, 酸処理加水分解との組み合わせ, 実機のオゾン増幅効果-. *紙パ技協誌* 54(7):933-942
23. Clemo E (1860) Nitric or Nitrous Acid, or the Aqua Fortis of Commerce in the Conversion of Straw and Grasses into Pulp for the Manufacture of Paper., U. S. Patent 29,059, July 10, 1860. [Bolker HI (1965) Delignification by Nitrogen Compounds. Action of nitrous acid on unbleached sulfite pulp., *I & E C Products Research and Development* 4(2): 74-79]
24. Chedin J (1960) An Improved Method for the Treatment of Cellulosic Materials with Nitric Acid and Alkali Solutions for the Purpose of Obtained Papermaking or Dissolving Pulps., Fr. Patent 1,251,326, December 12, 1960. [Abstract Bulletin of the Institute of Paper Chemistry (1963) 33(9): 8373]

25. Bolker HI (1965) Delignification by Nitrogen Compounds. Action of nitrous acid on unbleached sulfite pulp., *Ind Eng Chem Product Research and Development* 4(2):74-79
26. Bolker HI and Singh MM (1965) Delignification by Nitrogen Compounds II. Pulping spruce, birch, bamboo and bagasse with nitric-nitrous acid mixture., *Pulp Paper Mag Canada Convention Issue*: T165-T170
27. 大井洋、田尻政直、岩永雄三、鈴木正人、青柳哲夫、大内基弘 (1993) 亜硝酸前処理を用いるクラフトパルプの酸素漂白とその漂白機構. *紙パルプ技術協会誌* 47(5): 635-644
28. 池田努 (1998) 第 2 章クラフトパルプの希硫酸漂白., 筑波大学博士(農学)論文クラフトパルプの無塩素漂白に関する研究: pp.5-13
29. 具 延 (1999) 第 5 章酸性前処理過酸化水素漂白を用いた化学パルプの多段漂白, 筑波大学博士(農学)論文 化学パルプ中のマンガンの還元による過酸化水素漂白の改善:pp.60-72
30. Bolker HI, Kung FL and Kee ML (1967) Delignification by Nitrogen Compounds III. Preliminary studies on the mechanism of delignification by nitrous acid. *Tappi* 50(4): 199-202
31. Sobolev I (1963) Lignin Model Compounds. Nitric acid oxidation of 4-methylguaiacol. *J Org Chem*, 26: 5080-5085
32. 石川久雄(1990)第 9 章反応性及び誘導体:リグニンの化学—基礎と応用—(増補改訂版)、ユニ出版株式会社、pp.218-221
33. ウェン・バ・バ、石津敦、松本雄二、中野準三(1982)硝酸法パルプ化に関する研究(第 5 報)Guaiacylglycerol- $\beta$ -guaiacyl ether と希硝酸の反応. *紙パルプ技術協会誌* 36(8): 798-806
34. ウェン・バ・バ、石津敦、松本雄二、中野準三(1984)硝酸法パルプ化に関する研究(第 6 報)Veratrylglycerol- $\beta$ -guaiacyl ether と希硝酸の反応. *紙パルプ技術協会誌* 38(6): 675-680
35. Ogata Y, Sawaki Y (1966) Kinetics of the Nitric Acid Oxidation of Benzyl Ethers to Benzaldehydes. *J Amer Chem Soc* 88(24): 5832-5837
36. Gierer J, Nilvebrant N-O (1994) Studies on the Degradation of Lignins by Oxygen in Acidic Media. *Holzforschung* 48(Suppl.): 51-58

37. Ohi H, McDonough TJ (1992) Mechanism of Nitrogen Dioxide Pretreatment for Oxygen Bleaching of Kraft Pulp I. Reaction of free phenolic and nonphenolic lignin model compounds under NO<sub>2</sub> pretreatment conditions. *Mokuzai Gakkaishi* 38(6): 570-578
38. Samuelson O (1983) Oxygen Bleaching in the Future. The 2<sup>nd</sup> ISWPC, Tsukuba Science City, May 23-27, Preprint Vol. Supplement: pp.39-41
39. Iversen T (1985) Lignin-Carbohydrate Bonds in a Lignin Carbohydrate Complex Isolated from Spruce. *Wood Sci Technol* 19:243-251
40. 細谷修二、金沢健治、金子英信、中野準三 (1980) グアイアシルグリセロール-β-グアイアシルエーテルの合成. *木材学会誌* 26(2): 118-121
41. Adler E, Lindgren BO, Saedén U (1952) The Beta-Guaiacyl Ether of Alpha-Veratrylglycerol as a Lignin Model. *Svensk Papperstid* 55(7): 245-254
42. Leopold B (1950) Aromatic Keto-and Hydroxy-polyethers as Lignin Models III. *Acta Chem Scand*, 4: 1523-1537
43. Betzecki C (1963) Stereochemistry of Certain Addition Reactions Propenylbenzene II. Addition of acetyl nitrate and nitrogen trioxide. *Bulletin De L'academie Polonaise des Sciences Sérle des Sciences Chimiques* 11(3): 129-137
44. Lundquist K (1970) Acid Degradation of Lignin II. Separation and isolation of low molecular weight phenols. *Acta Chem Scand* 24(3): 889-907
45. Li S, Lundquist K (1999) Acid Reactions of Lignin Models of β-5 Type. *Holzforschung* 53(1): 39-42
46. Wallis AFA (1971) Solvolysis by Acid and Base in "Lignins occurrence, formation, structure and reactions ed K. V. Sarkanen, C. H. Ludwig" Wiley pp. 345-372
47. 砂原寛、大井洋 (2000) 熱分解クロマトグラフィーによるユーカリクラフトパルプ残存リグニンの構造解析. *木材学会誌*、印刷予定
48. Sipilä J, Syrjänen K (1995) Synthesis and <sup>13</sup>C-NMR Spectroscopic Characterization of Six Dimeric Arylglycerol-β-aryl Ether Model Compounds Representative of Syringyl and *p*-Hydroxyphenyl Structures in Lignins. On the aldol reaction in β-ether preparation. *Holzforschung* 49: 325-331
49. Lundquist K, Stomberg R, von Unge S (1987) Stereochemical Assignment of the *threo*

- and *erythro* Forms of 2-(2,6-Dimethoxyphenoxy)-1-(3,4-dimethoxyphenyl)-1,3-propanediol from X-Ray Analyses of the synthetic Intermediates (*Z*)-2-(2,6-dimethoxyphenoxy)-3-(3,4-dimethoxyphenyl)-3-hydroxypropanoic Acid. Acta Chem Scand B41: 499-510
50. Brunow G, Karisson O, Lundquist K, Spilä J (1993) On the Distribution of the Diastereomers of the Structural Elements in Lignins: the steric course of reactions mimicking lignin biosynthesis. Wood Sci Technol 27: 281-286
  51. 右田俊彦、永井洋一郎 (1994) 第 4 章反応機構と反応速度“有機反応機構(改訂版)” 裳華房, 東京, pp. 87、104-105
  52. Meshgini M, Sarkanen KV (1989) Synthesis and Kinetics of Acid-Catalyzed Hydrolysis of Some  $\alpha$ -Aryl Ether Lignin Model Compounds. Holzforschung 43: 239-243
  53. Loudon, G. Marc, in: Organic Chemistry (second edition)., 1988, Menlo Park, The Benjamin/Cummings Publishing Company, Inc., pp. 352-354.
  54. Leary GJ, Sawtell DA, Wong H (1983) The Formation of Model Lignin-Carbohydrate Compounds in Aqueous Solution. Holzforschung 37(1): 11-16
  55. Leary GJ, Sawtell DA, Wong H (1983) NMR Spectra of Benzyl Non-Cyclic Alkyl Ether Lignin Model Compounds. Holzforschung 37(4): 213-215
  56. Brunow G, Lundquist K (1991) On the Acid-Catalyzed Alkylation of Lignin. Holzforschung 45:37-40
  57. Helm RF, Ralph J (1993) Stereospecificity for the Zinc Borohydride Reduction of  $\alpha$ -Aryloxy- $\beta$ -Hydroxy Ketones. J Wood Chem Technol 13(4): 593-601
  58. Sarkanen KV, Hoo LH (1981) Kinetics of Hydrolysis of *erythro*-Guaiacylglycerol- $\beta$ -(2-methoxyphenyl)ether and Its Veratryl Analogue Using HCl and Aluminum Chloride as Catalysts. J Wood Chem Technol 1(1): 11-27
  59. Ralph J, Young RA (1981) Synthesis of the Lignin Model Compounds *threo*-Guaiacylglycerol- $\beta$ -Guaiacyl ether and *threo*-Veratrylglycerol- $\beta$ -Guaiacyl Ether. Holzforschung 35(1): 39-41
  60. Wallis AFA, Lundquist K, Stomberg R (1991) Stereochemistry of 1-Arylpropane-1,2-diol 2-Aryl ethers. X-Ray structures of the diastereomers of 1-(4-acetoxy-3,5-dimethoxyphenyl)-2-{2,6-dimethoxy-4-[(*E*)-propenyl]phenoxypropyl acetate. Acta

- Chem Scand, 45:508-516
61. Wallis AFA (1973) Oxidation of (*E*) and (*Z*)-2,6-Dimethoxy-4-Propenylphenol with Ferric Chloride-A facile Route to the 2-aryl ether of 1-arylpropan-1,2-diols. Aust J Chem, 26: 585-594
  62. Ede RM, Main L, Ralph J (1990) Evidence for Increased Steric Compression in *anti* Compared to *syn* Model Quinone Methides. J Wood Chem Technol 10(1):101-110
  63. Lundquist K (1979) NMR Studies of Lignins 3. <sup>1</sup>H-NMR spectroscopic data for lignin model compounds. Acta Chem Scand B33: 418-420
  64. Mörek R, Kringstad KP (1985) <sup>13</sup>C-NMR Spectra of Kraft Pulp II. Kraft lignin acetates. Holzforschung 39:109-119
  65. Ahvonen T, Brunow G, Kristersson P, Lundquist K (1983) Stereoselective Syntheses of Lignin Model Compounds of the  $\beta$ -O-4 and  $\beta$ -1 Type. Acta Chem Scand B37: 845-849
  66. Brunow G, Sipilä J, Lundquist K, von Unge S (1988) The Preparation of *threo* Forms of  $\beta$ -O-4 Type Lignin Model Compounds. Cellulose Chem and Technol 22: 191-199
  67. Adler E, Brunow G, Lundquist K (1987) Investigation of the Acid-Catalyzed Alkylation of Lignins by Means of NMR Spectroscopic Method. Holzforschung 41: 199-207
  68. Helm RF, Li K (1995) Complete *threo*-Stereoselectivity for the Preparation of  $\beta$ -O-4 Lignin Model Dimers. Holzforschung 49: 533-536
  69. Ohi H, Ishizu A (1989) Behavior of Lignin during Alkaline Sulfite Quinone Cooking II. Mokuzai Gakkaishi 35(8): 748-753
  70. 具延、大井洋、ニヨングハオ (2000) 酸性前処理によるクラフトパルプ化酸化水素漂白の改善 マンガンの酸化状態が過酸化水素の分解におよぼす影響. 紙パ技協誌 54(4): 556-564
  71. Vuorinen N, Fagerstrom P, Buchert J, Tenkanen M, Teleman A (1999) Selective Hydrolysis of Hexenuronic Acid Groups and its Application in ECF and TCF Bleaching of Kraft Pulps. J Pulp Paper Sci 25(5): 155-162.
  72. Ikeda T, Tomimura Y, Magara K, Ishihara M, Hosoya S (1999) Sulfuric Acid Bleaching of Kraft Pulp III Reactivity of kraft pulping resistant structures under acidic conditions. J Wood Sci 45(5): 417-424

73. 池田努 (1998) 第 4 章希硫酸漂白機構., 筑波大学博士(農学)論文クラフトパルプの無塩素漂白に関する研究: pp.27-50
74. Clarke GL (1944) Tappi Ser.27: 631 [Bolker HI (1965) Delignification by Nitrogen Compounds. Action of nitrous acid on unbleached sulfite pulp. Ind Eng Chem Product Research and Development 4(2): 74-79]
75. Lindeberg O, Walding J (1987) Reaction of Nitrated Kraft Lignin in an Alkaline Oxygen Bleaching Stage. Tappi 70(10): 119-123
76. Dence CW, Reeve DW (1996) editors: Pulp Bleaching Principles and Practice, TAPPI PRESS, Atlanta, pp.812.
77. Crawford RJ, Stryker MN (1998) Factors That Affect the Generation of Chloroform in Bleaching. Tappi J 71(11): 151-159
78. 大井洋、増沢喜良 (2000) クラフトパルプの塩素漂白におけるクロロホルム生成 固相マイクロ抽出法による分析と評価. 紙パ技協誌 54(11): 印刷中.
79. Wiegand P, Thacker W, Miner R (1999) Effluent Quality at Kraft Mills That Use Complete Substitution Bleaching. TAPPI J 82(4): 135-144.