Polarity study of Al hydroxide-polyphenol nanoparticles using thin layer chromatography

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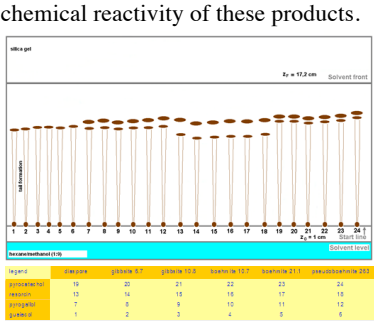
In this study, thin layer chromatography (TLC) was used to examine the differences of organomineral complexes by its polarity. The TLC study was carried out by using various types of organomineral complexes of varying BET surfaces that were synthesized by adsorption in a gas-solid phase at 50 °C in the presence of atmospheric pressure for a period of 60 days in total darkness. Gibbsite, pseudoboehmite, boehmite and diaspore, and four types of phenolic compound being pyrocatechol, resorcinol, pyrogallol and guaiacol were used. The analysis was carried out by applying the ascending TLC method that consisted of a thin layer of silica gel and a solvent mixture of 1:9 hexane-methanol. Subsequent analysis of the TLC chromatogram was achieved in which the retention factor R_f was clearly identified. The TLC chromatogram showed specific sequences of the separated compounds which confirmed the existence of various reaction products of organomineral complexes. On examining the effects of sequence length, polarity gradients of the separated compounds were clearly observed. Two of the horizontal spot lines of the $C_6H_6O_2$ and $C_6H_6O_3$ compounds presented a distinct image showing the highest R_f values ranging from 0.64 to 0.83. In comparison, the highest R_f values of the $C_7H_8O_2$ compounds were observed in the range of 0.71 to 0.74 which confirmed only one distinct spot line. The separated compounds were identified as intermediate reaction products that were formed by the organomineral complexation. As confirmed by the results of the polarity, charge transfers of the intermediate reaction products showed various intensities caused by the unbalanced chemical reactivity of these products.



[1] Franke M (2002) diploma thesis, University of Trier, 187 pp.