Normal basis generators in p-extensions of local fields

After a short survey on normal bases over number fields, we will investigate a criterion for an element to generate a normal basis in a totally ramified p-extension over some local field K of residue characteristic $p > 0$. Precisely, answering a recent question of Byott and Elder in a more general setting, we will present a valuation criterion that is valid for all p-extensions when $\mathrm{car}(K) = p$ but that faces some obstructions when $\mathrm{car}(K) = 0$. The talk will develop properties of ramification groups and jumps, as well as some arguments from representation theory.

Part of the work presented here is joint work with M. Florence and B. de Smit.