

Supplementary information

Table S1: Semi-quantification of crystalline phase composition for samples L-1 to L-11 from pilot-scale experiment.

Time scale [h]	1	2	3	4	5	6	7	8	9	10	11
Sample number	1	2	3	4	5	6	7	8	9	10	11
(Ca,Mg)NaPO ₄	[Phase present in all samples]										
CaNaPO ₄	[Phase present in all samples]										
Whitlockite Ca _{3-x} (Mg,Fe) _x (PO ₄) ₂	[Phase present in all samples]										
Lazurite Na ₃ CaAl ₃ Si ₃ O ₁₂ SO ₄	[Phase present in all samples]										
Nepheline (Na,K)AlSiO ₄	[Phase present in all samples]										
Kalsilite KAlSiO ₄	[Phase present in all samples]										
Leucite KAlSi ₂ O ₆	[Phase present in all samples]										
Quartz SiO ₂	[Phase present in all samples]										
Na ₂ SO ₄	[Phase present in all samples]										
NaK ₃ (SO ₄) ₂	[Phase present in all samples]										
K ₂ SO ₄	[Phase present in all samples]										
Magnetite Fe ₃ O ₄	[Phase present in all samples]										

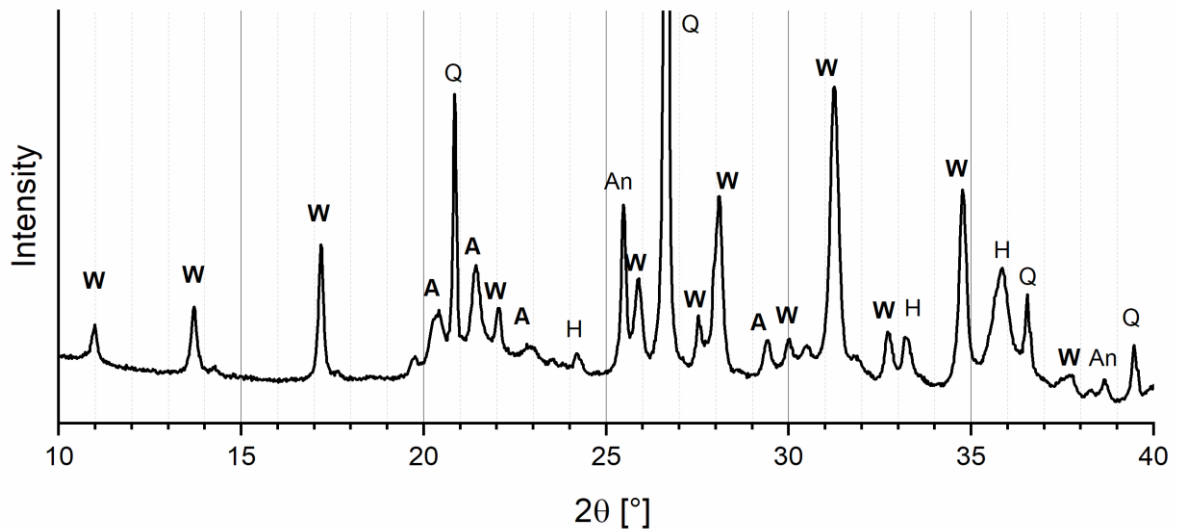


Figure S1: Diffraction pattern of sewage sludge ash. Phosphate phases (bold): A- AlPO_4 , W-whitlockite type; Other phases: An-Anhydrat CaSO_4 , H-Hematite Fe_2O_3 , Q-Quartz SiO_2 .

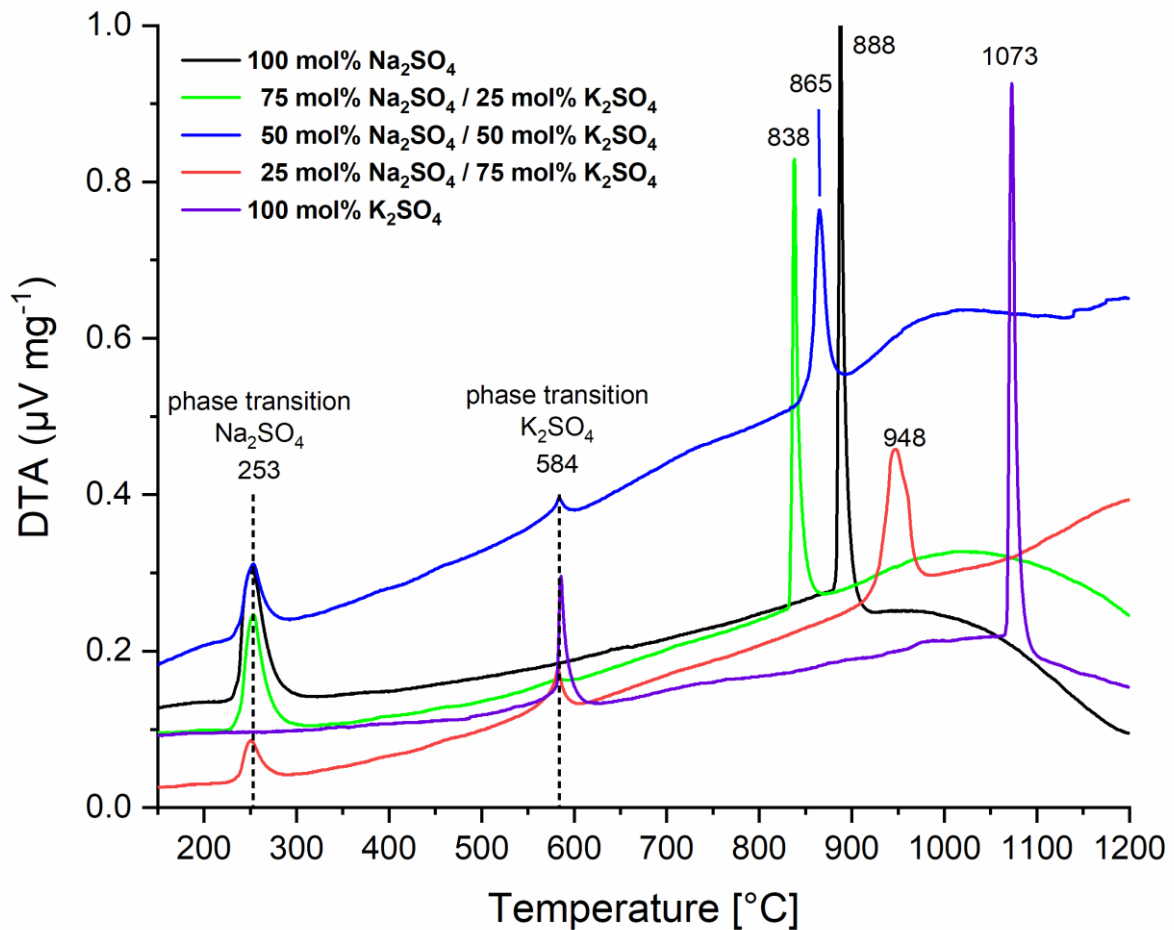


Figure S2: differential thermal analysis (DTA) for different mixtures of Na_2SO_4 and K_2SO_4 .

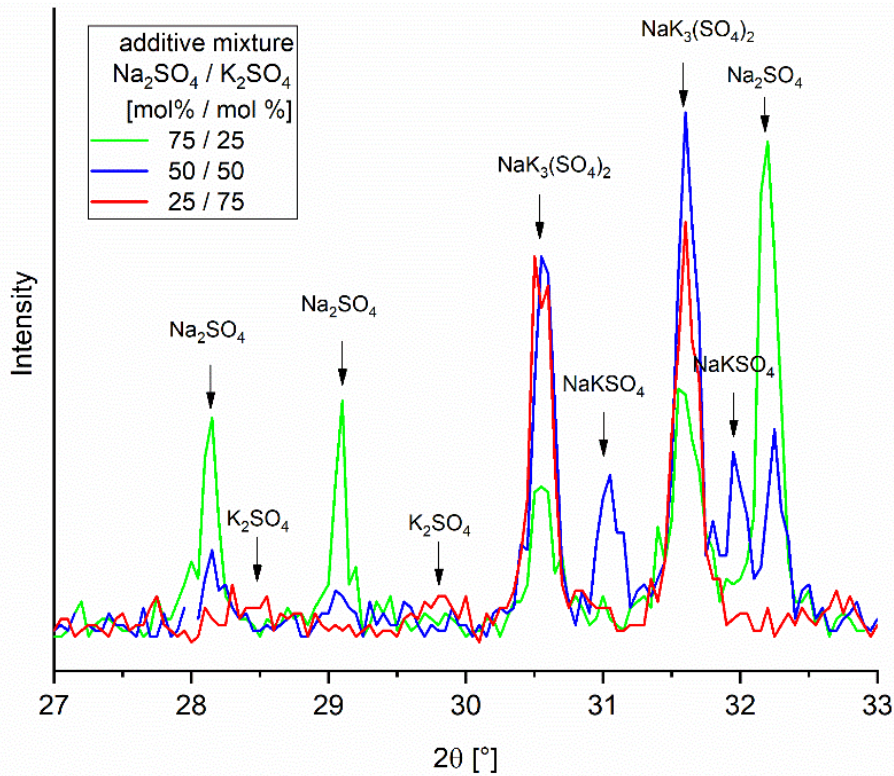


Figure S3: Section of diffraction pattern for different mixtures of Na_2SO_4 and K_2SO_4 after milling and heating at $600\text{ }^\circ\text{C}$ for 12 h

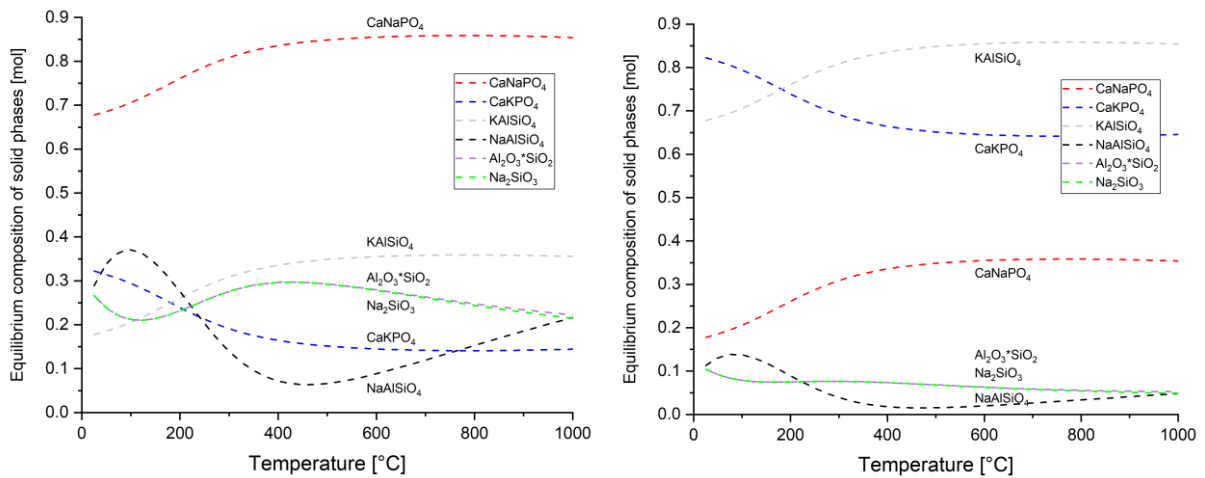


Figure S4: Equilibrium compositions of the solid phase products depending on temperature using thermodynamic calculation software HSC Chemistry. Calculations are related to crucible trial CT-K25 (left) and CT-K75 (right)