Supplementary Material (ESI) for Analyst

Electrochemical behavior of lactate dehydrogenase immobilized on "silica sol–gel/nanometer-sized tridecameric aluminium polycation" modified gold electrode and its application

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TABLE 1. Different nano-size distributions of K-Al_{13} for different groups

Groups	Preparation method	Particle size distribution of single K-Al_{13} polymer and its aggregates
This work	The hydroxyl polyaluminum (HPA) solution with OH/Al=2.3 is prepared with alkalinity titration method; from this solution, purified K-Al_{13} solution is further prepared with SO_4^{2-}/Ba^{2+} method.	Particle size of K-Al_{13} aggregates is 200-500 nm. (Dynamic light scattering (DLS) measurement, Brookhaven BI200SM, USA)
	Single K-Al_{13} polymer in HPA solutions	
Perry C.C.	The HPA solutions with OH/Al=1.5-2.7 are prepared with alkalinity titration method, and then aged 1 h, 3 h and 24 h[1, 2].	Aging 1 h, the particle size is 0.75-1.50 nm; Aging 3 h, the particle size is 0.91-1.46 nm; Aging 24 h, the particle size is 0.75-2.27 nm. (DLS measurement, Coulter N4plus particle size meter, USA)
	K-Al_{13} aggregates in HPA solutions	
Qu J.H.	The HPA solutions with OH/Al=2.0 and 2.5 are prepared with electrochemical method[3].	Particle size of K-Al_{13} aggregates in the HPA solution with OH/Al=2.0 is 8-220 nm, and that in the HPA solution with OH/Al=2.5 is 8-425nm. (DLS measurement, Brookhaven BI200SM, USA)
	The HPA solutions with OH/Al=2.14 and 2.23 are prepared with electrochemical method[4].	Particle size of K-Al_{13} aggregates in the HPA with OH/Al=2.14 is 27-526 nm, and that in the HPA with OH/Al=2.23 is 43-288 nm. (DLS measurement, Brookhaven BI200SM, USA)
	K-Al_{13} aggregates in purified K-Al_{13} solutions	
Gao B.Y.	The HPA solution with OH/Al=2.4 is prepared with alkalinity titration method; from this solution, purified K-Al_{13} solution is further prepared with SO_4^{2-}/Ba^{2+} method, column chromatography method and precipitation with adding ethanol and acetone[5].	The average particle sizes of K-Al_{13} aggregates obtained from these three methods are 63, 18 and 42 nm, respectively. (Particle size measurement, Zetasizer-3000 HS_A, UK)
ChuY.B	The HPA solution with OH/Al=2.5 is prepared with alkalinity titration method; from this solution, purified K-Al_{13} solution is further prepared with column chromatography method[6].	Particle size of K-Al_{13} aggregates is 70-150 nm. (Particle size measurement, Zetasizer-3000 HS_A, UK)
Luan Z.K.	The HPA solution with OH/Al=2.4 is prepared with alkalinity titration method; from this solution, purified K-Al_{13} solution is further prepared by precipitation with adding ethanol and acetone[7].	Particle size of K-Al_{13} aggregates is 200 nm-2 μm. (SEM, Hitachi S-520, Japan)

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