Supplementary information to the publication “Evaluation of the tensile adhesion strength of cathode coatings from spent lithium-ion batteries using a centrifugal method”

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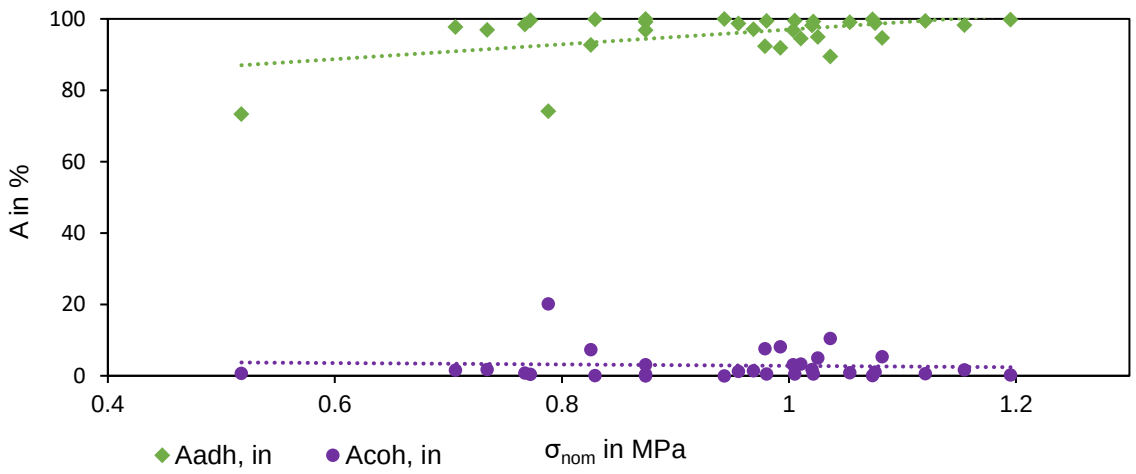
Note: The appendixes below are related to the written text in the main publication. Data related to the diagrams (Figures 4 to 8) is enclosed as .xls-files to the supplementary material (OPARA). Microscopy data and metadata from centrifugal tests is enclosed as archives (OPARA).

Appendix 1

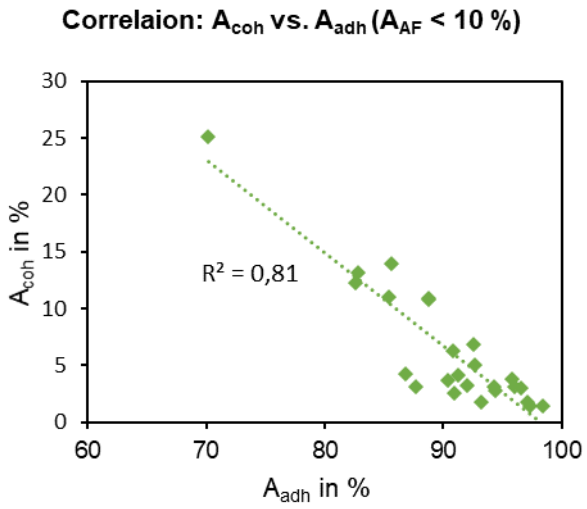
Tape Type	Tens. Adh. Strength in MPa	Dwell Time in h	Area (tape) in mm²	n (Sample Amount)	General Comment
3M VHB 4905	0,721	24,5	78,540	8	For this test setup double sided tape was applied between support plate and piston
Tesa 5696	1,109	22	78,540	8	
Lohmann Duplocoll 362.2	1,316	20	78,540	7	

Appendix 2

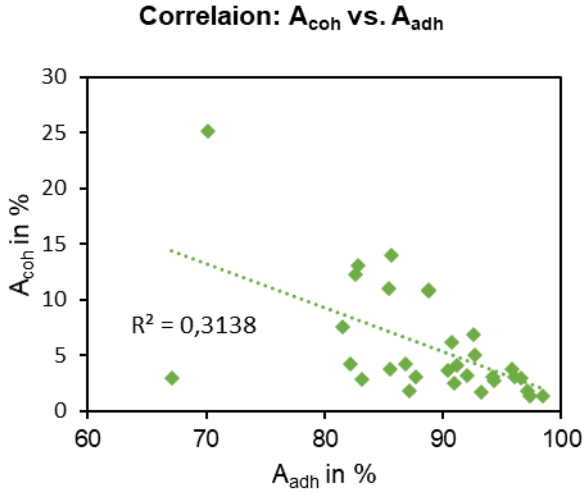
Sample Name	Centrifugal Force in N	Tens. Adh. Strength in MPa	rpm	Force Ramp Rate in N/s	Comment
VHB-1	57,185	0,728	1942,768	5,0	Viscoelastic Stringing; Highly elastic behaviour; Approx. 75% of tape remained on support plate
VHB-2	59,187	0,754	1976,494	5,0	
VHB-3	54,910	0,699	1903,743	5,0	
VHB-4	54,296	0,691	1893,059	5,0	
VHB-5	56,285	0,717	1927,424	5,0	
VHB-6	55,250	0,703	1909,619	5,0	
VHB-7	58,215	0,741	1960,194	5,0	
VHB-8	57,470	0,732	1947,616	5,0	
Tesa-1	89,252	1,136	2390,256	5,0	Viscoelastic Stringing; Unevenly distributed remainings (support plate/stamp); Rupture of adhesive tape even on intermediate layer-glue-layer interface
Tesa-2	80,276	1,022	2266,878	5,0	
Tesa-3	78,174	0,995	2236,997	5,0	
Tesa-4	92,236	1,174	2429,887	5,0	
Tesa-5	89,061	1,134	2387,690	5,0	
Tesa-6	89,440	1,139	2392,767	5,0	
Tesa-7	92,573	1,179	2434,316	5,0	
Tesa-8	85,872	1,093	2344,563	5,0	
Duplocoll-1	107,424	1,368	2622,3	5,0	Rupture of adhesive tape dominating on plate side; Position 6 discard due to interference on detection module
Duplocoll-2	115,063	1,465	2714,0	5,0	
Duplocoll-3	109,589	1,395	2648,6	5,0	
Duplocoll-4	100,059	1,274	2530,8	5,0	
Duplocoll-5	102,961	1,311	2567,3	5,0	
Duplocoll-6	12,799	0,163	905,1	5,0	
Duplocoll-7	84,628	1,078	2327,5	5,0	
Duplocoll-8	103,543	1,318	2574,5	5,0	



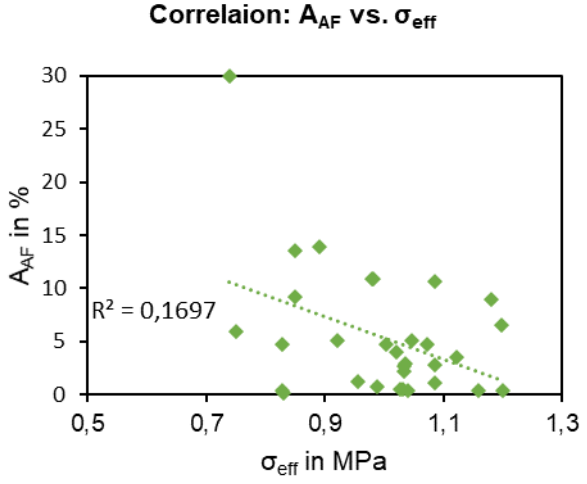
Appendix 3



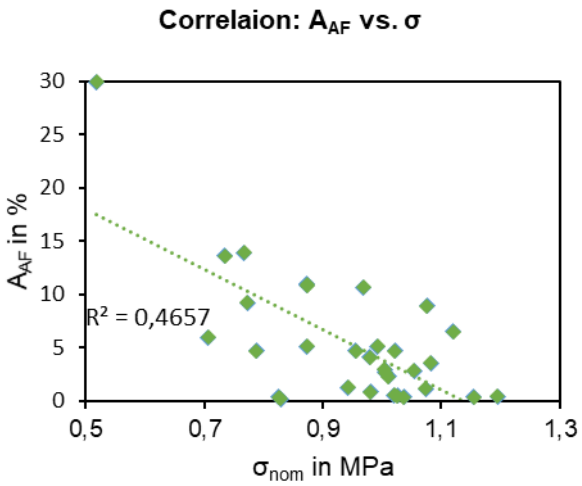
Appendix 4



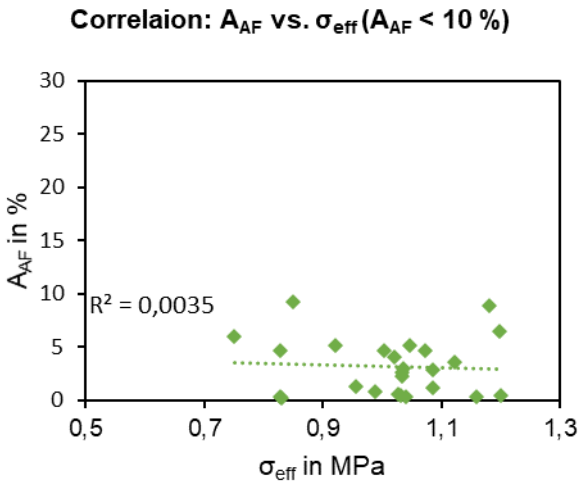
Appendix 5



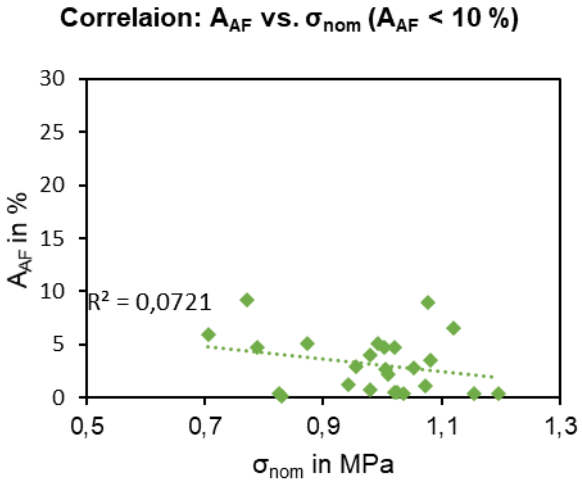
Appendix 6



Appendix 7



Appendix 8



Appendix 9