Cross-linked \( \beta \)-CD-CMC as an effective aqueous binder for silicon-based anode in rechargeable lithium-ion batteries

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The effect of the cross-linking ratio of \( \beta \)-CD to CMC on the electrochemical performance of the electrode is shown in Fig. S1. The binders synthesized with \( \beta \)-CD excess and CMC excess were compared with the samples synthesized in equal amounts, respectively. The results show that the electrode exhibits the characteristics of a pure CMC electrode when there is an excess of CMC, with the electrode having the highest initial capacity. When there is an excess of \( \beta \)-CD the electrode exhibits the characteristics of pure \( \beta \)-CD, with a low initial capacity but a gentle trend of capacity decay. Their capacity retention rates were 41\%, 47\% and 49\% respectively. The equal
synthesized samples have the highest capacity retention and a gentle capacity decay trend.