



Supplementary Information

Fast Responsive, Reversible Colorimetric Nanoparticle-Hydrogel Complexes for pH Monitoring

Yeonjin Kim ^{1,†}, Taeha Lee ^{1,2,†}, Minsu Kim ¹, Soojin Park ¹, Jiashu Hu ¹, Kyungwon Lee ¹, Yoochan Hong ^{3,*}, Insu Park ^{4,*} and Gyudo Lee ^{1,2,*}

¹ Department of Biotechnology and Bioinformatics, Korea University, Sejong 30019, Republic of Korea

² Interdisciplinary Graduate Program for Artificial Intelligence Smart Convergence Technology, Korea University, Sejong 30019, Republic of Korea

³ Department of Medical Device, Korea Institute of Machinery and Materials (KIMM), Daegu 42994, Republic of Korea

⁴ Department of Biomedical Engineering, Konyang University, Daejeon 35365, Republic of Korea

* Correspondence: ychong1983@kimm.re.kr (Y.H.); insupark@konyang.ac.kr (I.P.); lk0807@korea.ac.kr (G.L.)

† These authors contributed equally to this work.

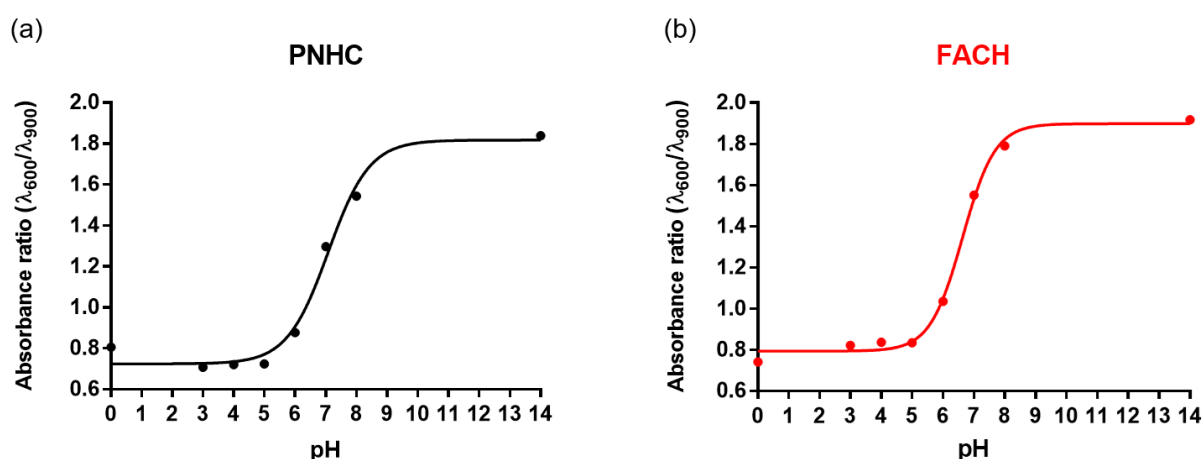


Figure S1. Absorbance ratio ($\lambda_{600}/\lambda_{900}$) including pH 0 and 14 conditions of (a) PNHC and (b) FACH. Hydrogels were treated with various pH solutions for a sufficient time (1 h) for chemical reactions.

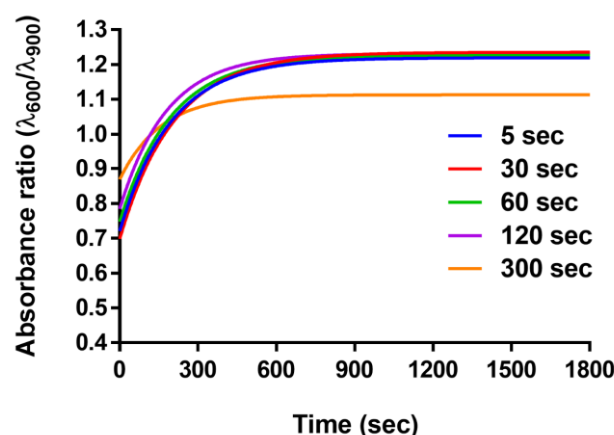


Figure S2. Measurement of FACH reaction rate according to ferrocene treatment time (5, 30, 60, 120, and 300 s). To the pH 3 hydrogels treated with ferrocene for different times, 2 mL of PBS (pH 8) was added, and the absorbance ratio ($\lambda_{600}/\lambda_{900}$) was observed for 30 min.