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Supplementary Information

NMR studies of the interactions between AMB-1 Mms6 protein and magnetosome Fe_3O_4 nanoparticles

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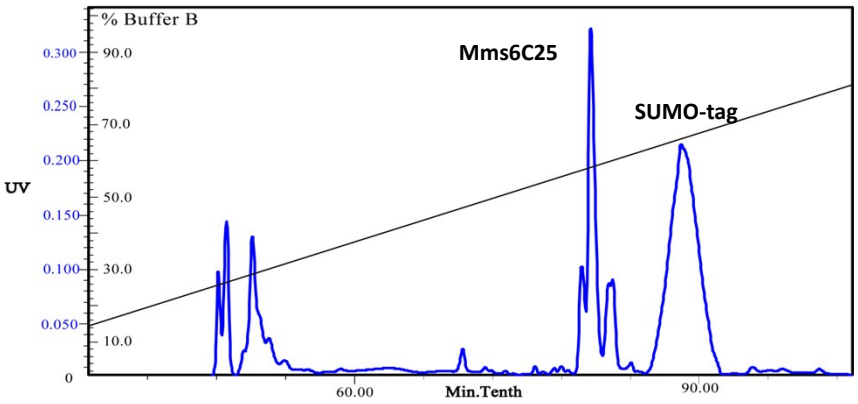
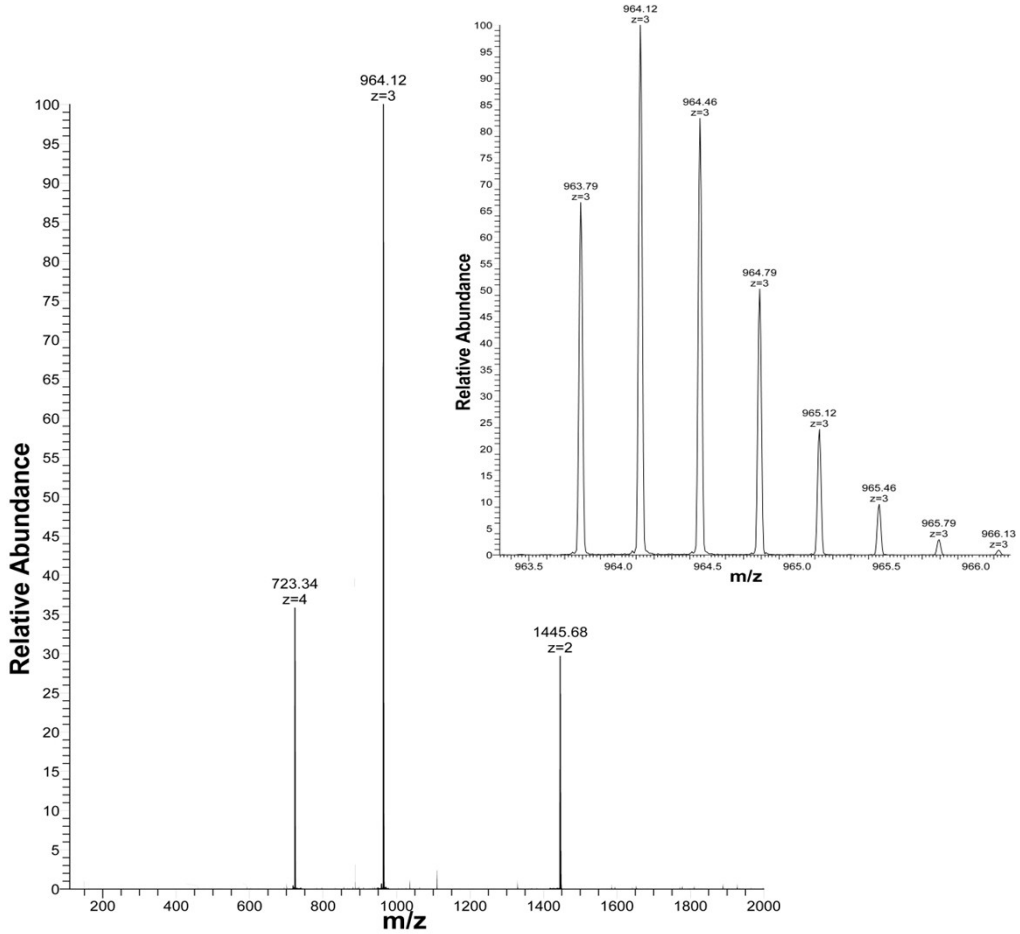
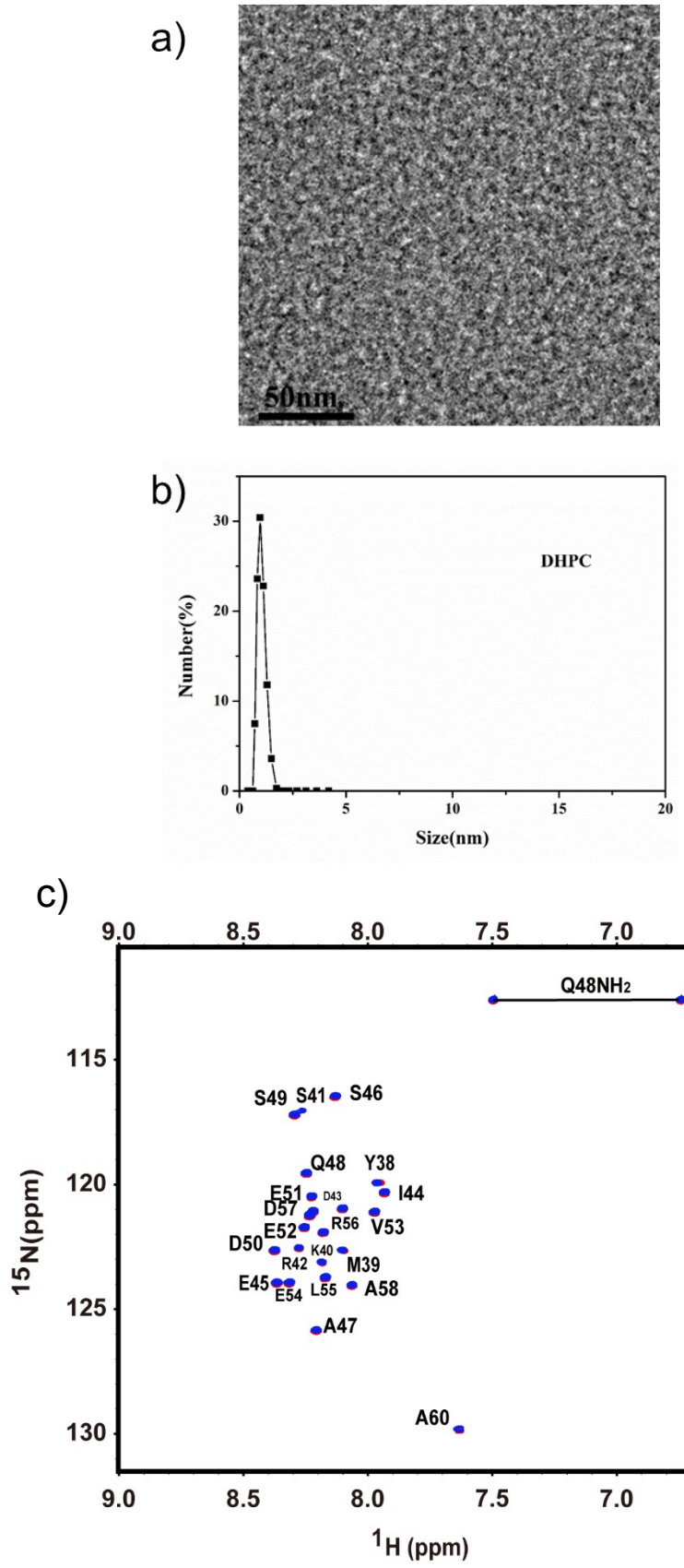
Experimental Results:-



Supplementary Figure 1S. RP-HPLC purification of the recombinant Mms6C25. The Mms6C25 elution peak (acetonitrile concentration68–72%) matches with the synthetic Mms6C25 peptide.

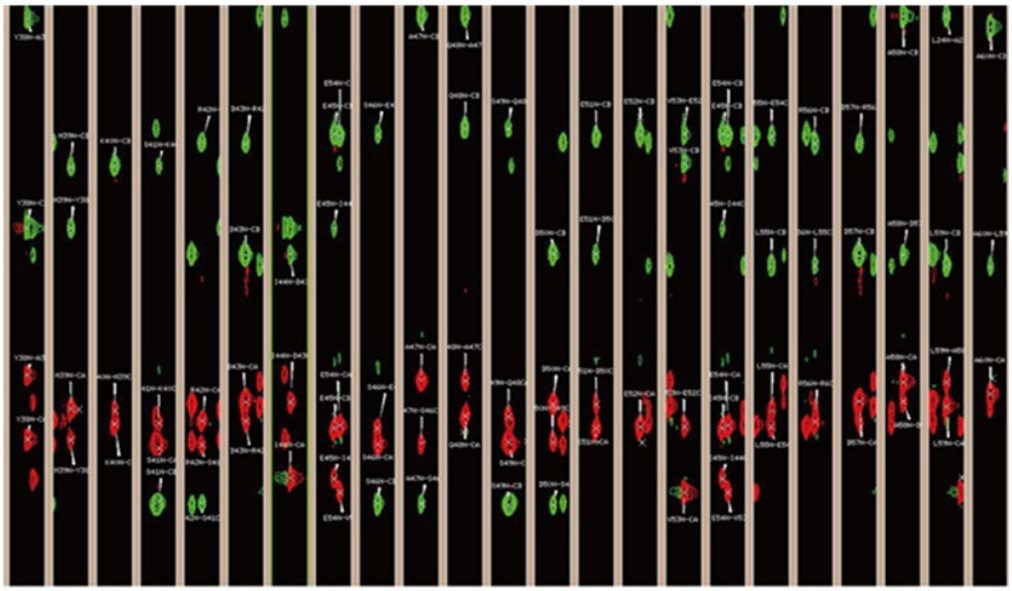


Supplementary Figure 2S. ESI-MS analysis of Mms6C25 fraction from RP-HPLC purification, confirming the sequence correction of Mms6C25 (m/z 964.12, z=3).



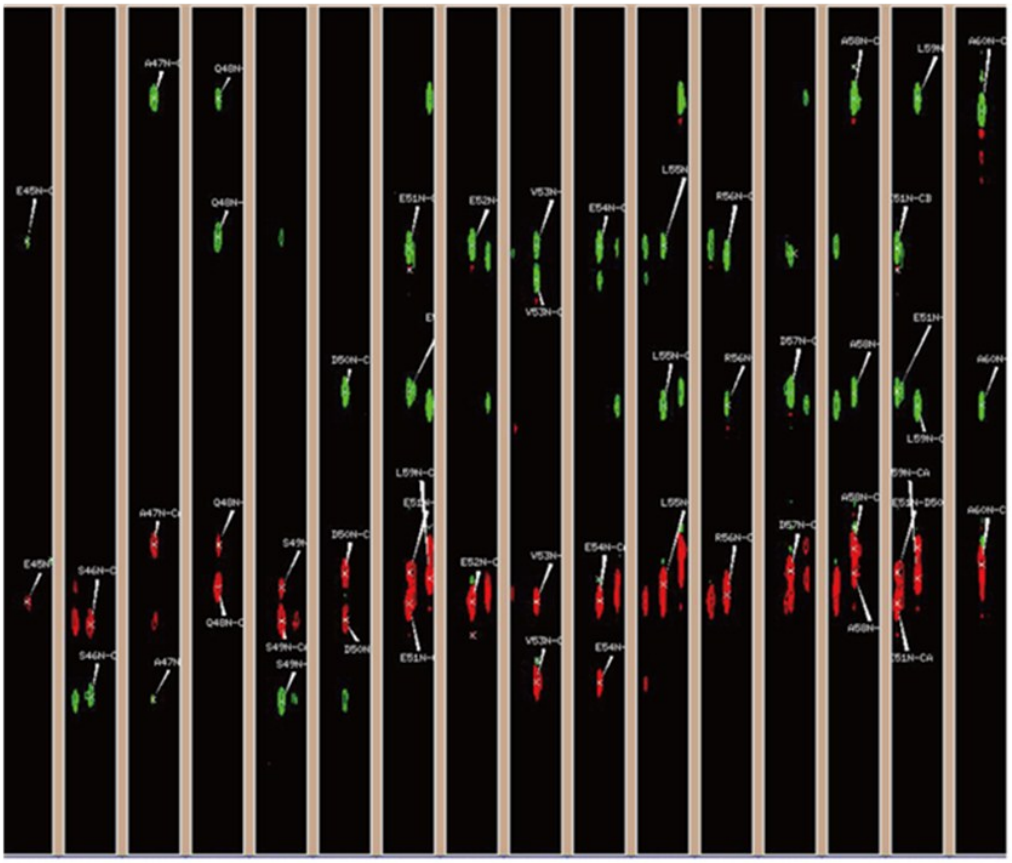
Supplementary Figure 3S. Characterization of pure DHPC micelle at 14 mM: (a) the high-resolution transmission electron microscopy (TEM) image, and (b) the size distribution measured by dynamic light scattering (DLS), and **(c)** the superimposition of $^{1}H–^{15}N$ HSQC spectra of Mms6C25 with (blue) or without DHPC detergent (red)

a）



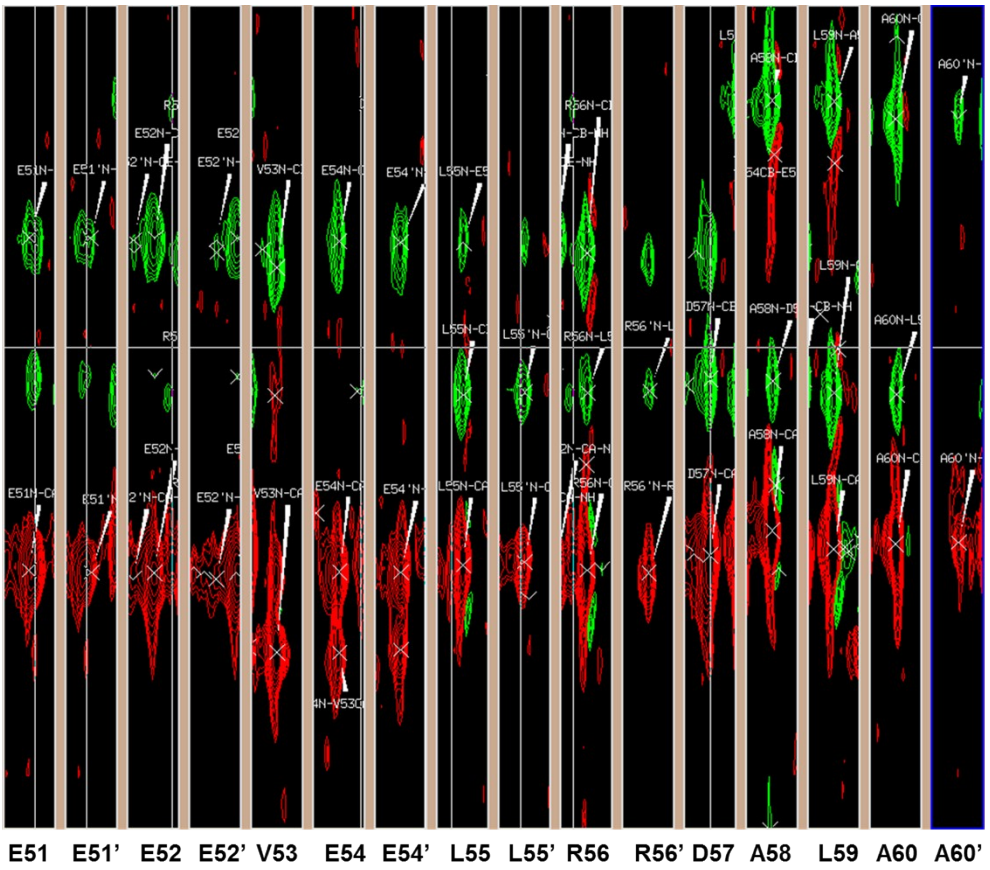
Y38 M39 K40 S41 R42 D43 I44 E45 S46 A47 Q48 S49 D50 E51 E52 V53 E54 L55 R56 D57 A58 L59 A60

b）

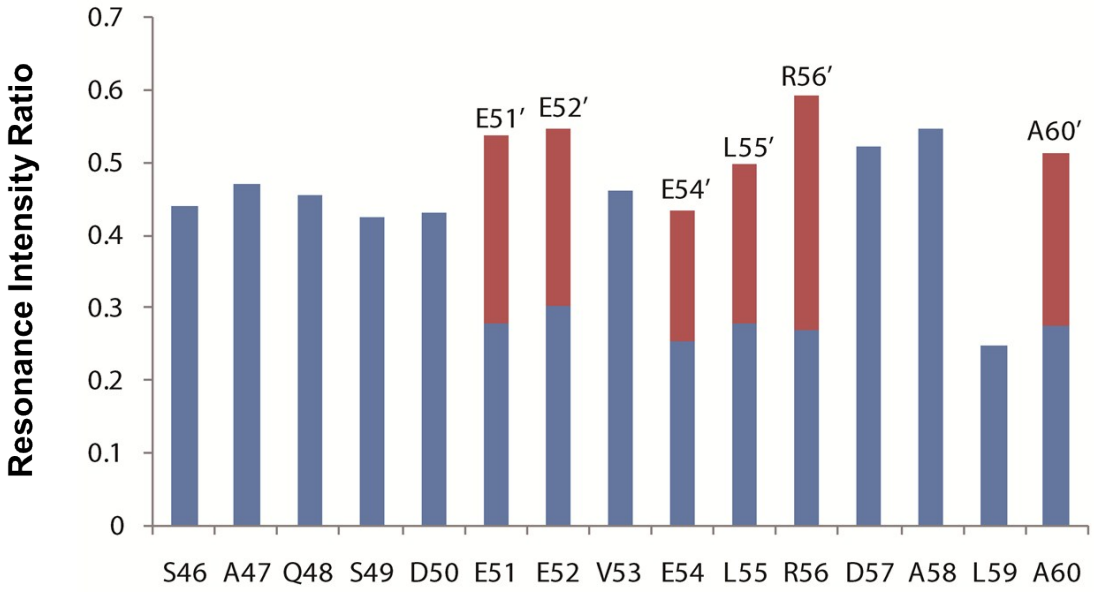


E45 S46 A47 Q48 S49 D50 E51 E52 V53 E54 L55 R56 D57 A58 L59 A60

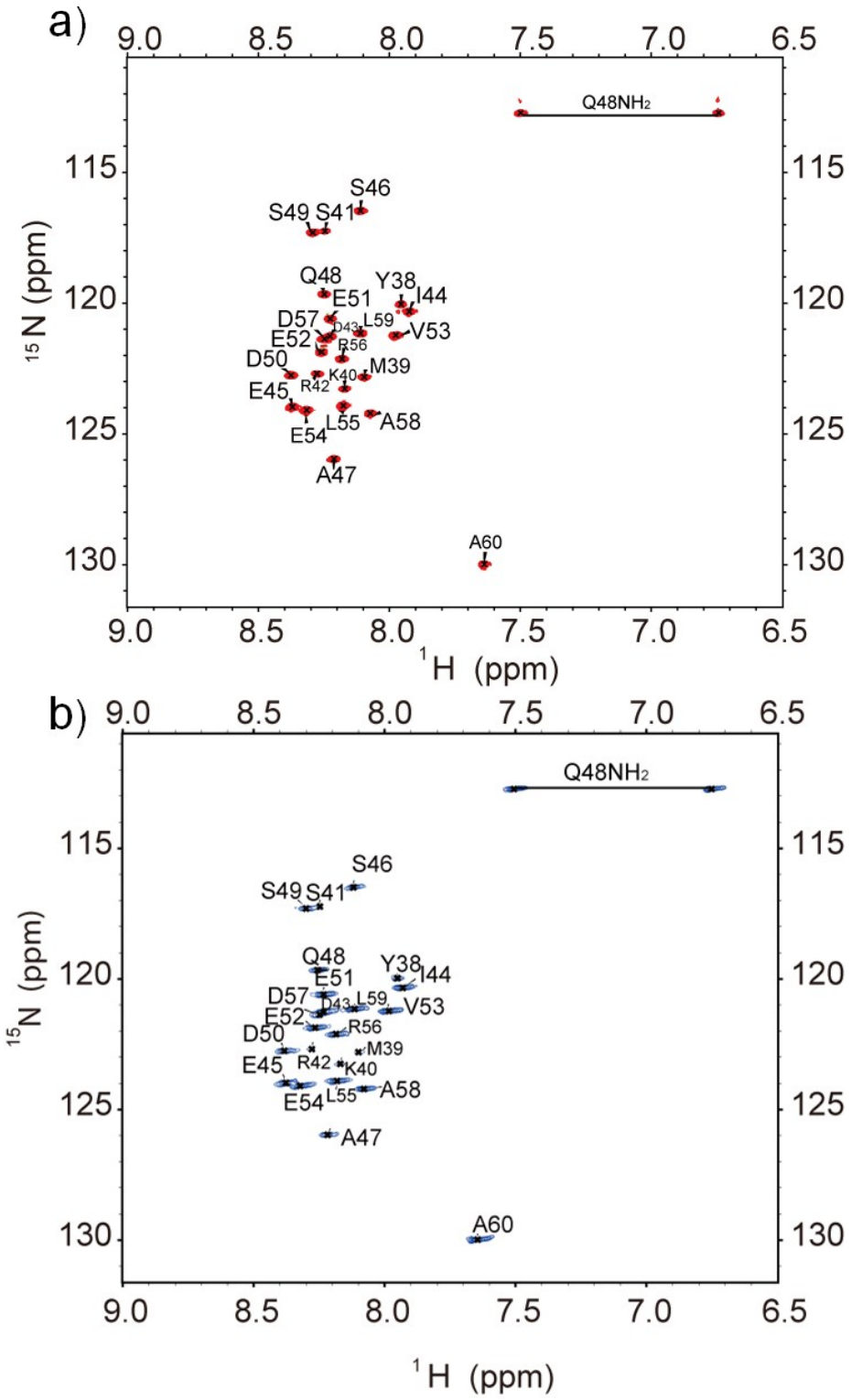
C)



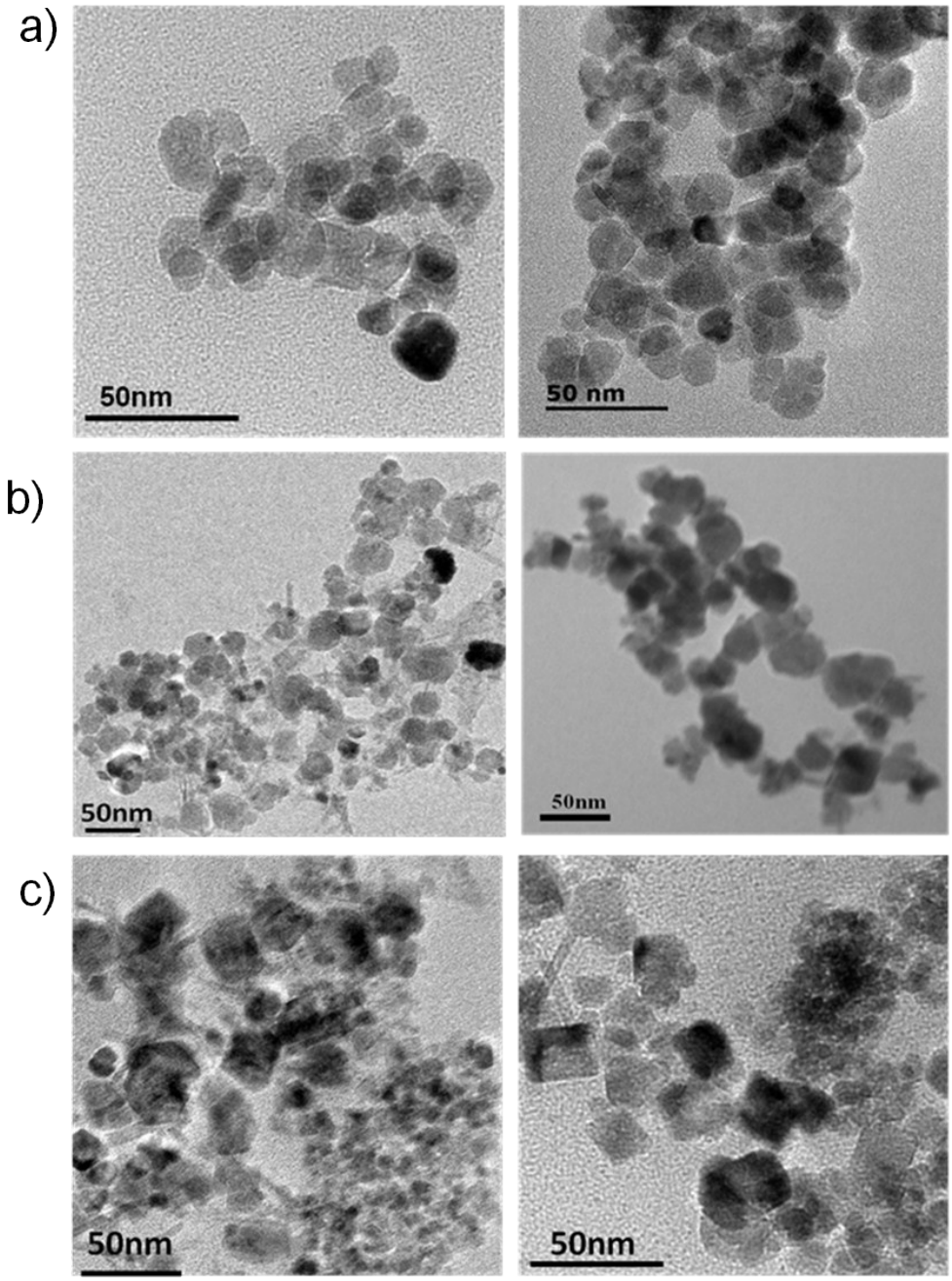
Supplementary Figure 4S. Strip plots of HNCACB experiments for the backbone assignments of a) Mms6C25, b) Mms6 and c) Mms6 in the presence of magnetosome MNPs.



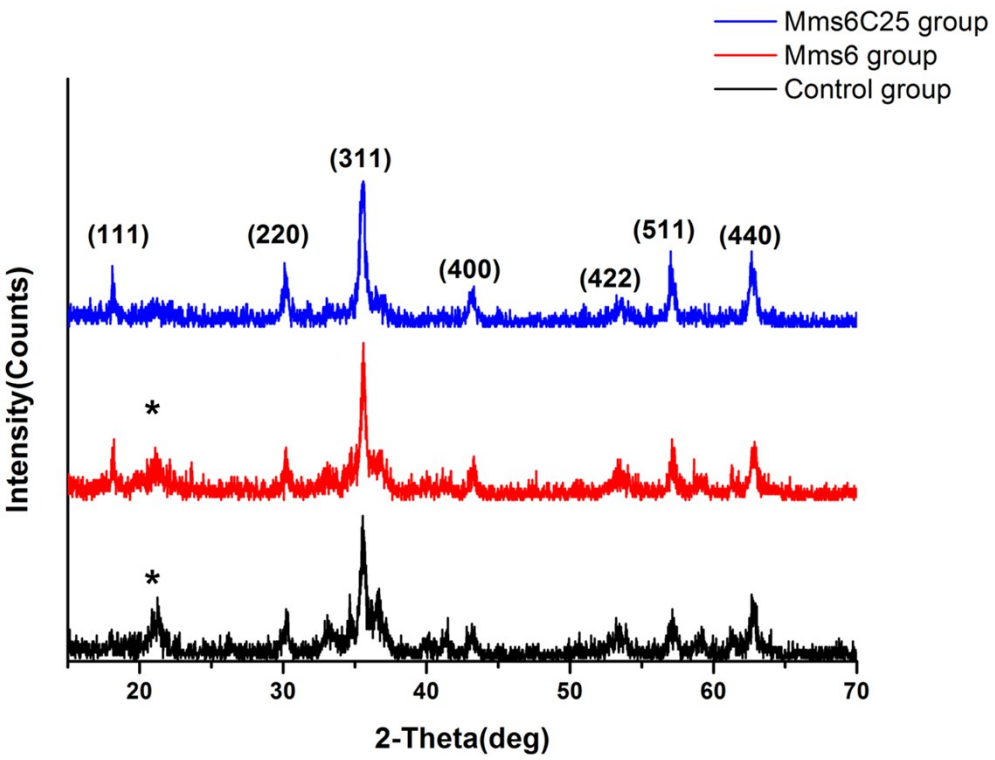
Supplementary Figure 5S. Resonance intensity changes of Mms6 protein after magnetosome MNP binding. Blues bars represent resonances with no chemical shift changes, while red bars represent new set of peaks from binding. The intensities of resonances from the same residues are summed up and compared with the peak intensities before magnetosome MNP binding. Signals decrease by 50% in average.



Supplementary Figure 6S. The^{1}H–^{15}N HSQC spectrum ofMms6C25 a) in the absence of magnetosome MNPs (red) and b) presence of magnetosome MNPs (blue).



Supplementary Figure 7S. TEM images of Chemical synthesis MNPs (used for MNP size analysis). (a) Synthesized in the presence of Mms6. (b) Synthesized in the presence of Mms6C25. (c) Synthesized with no protein.



Supplementary Figure 8S. Powder XRD crystallinity data for MNPs produced by RTCP method. The asterisk peaks are likely to be bernalite $(Fe(OH)_3(H_2O)_{0.25})$.[1]

1. T. Prozorov, S. K. Mallapragada, B. Narasimhan, L. Wang, P. Palo, M. Nilsen‐Hamilton, T. J. Williams, D. A. Bazylinski, R. Prozorov and P. C. Canfield, *Advanced Functional Materials*, 2007, **17**, 951-957.