

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali^{1,2*}, Amar Mousa Mandal³, Thorsten Heidelberg⁴, and Rusnah Syahila

Duali Hussen⁴

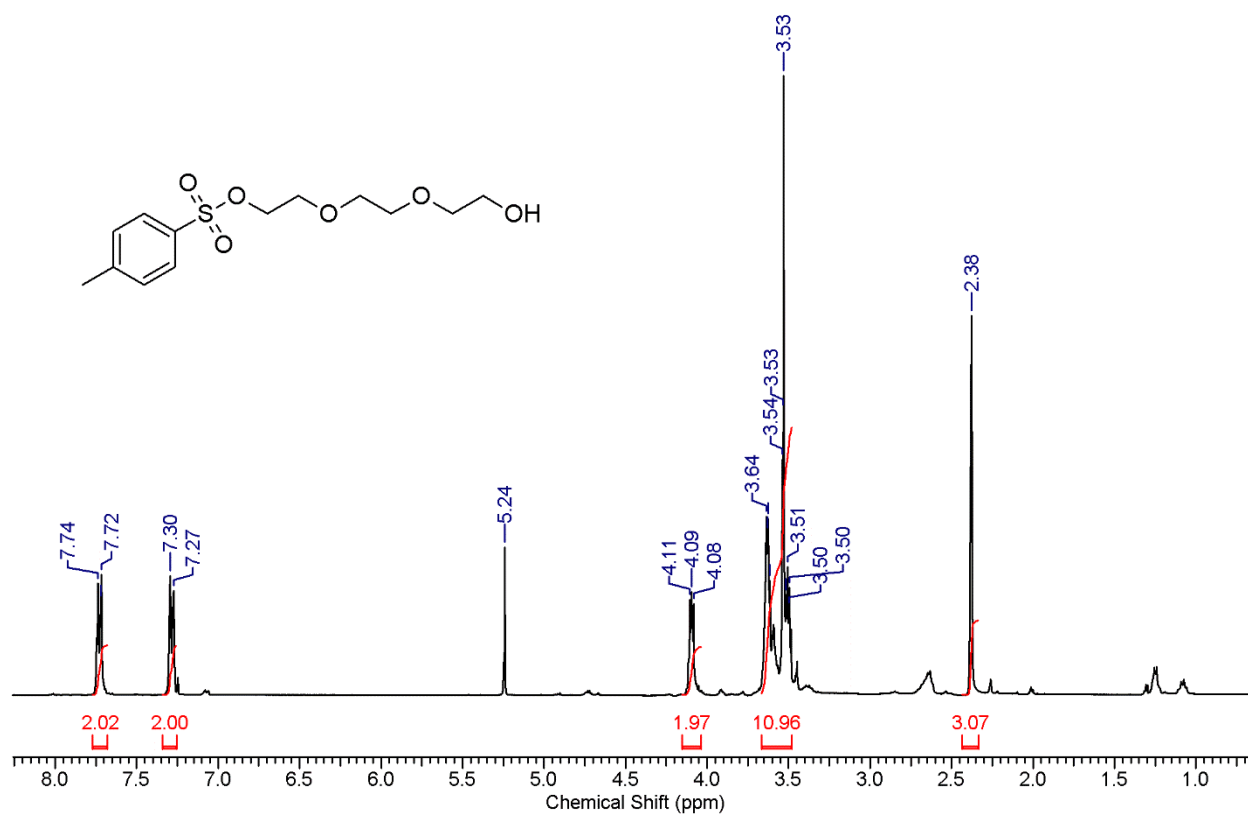
¹ Faculty of Pharmacy, Al-Muthanna University, 66001 Samawah, Al Muthanna. Iraq.

² Molecular Design and Synthesis, Department of Chemistry, KU Leuven, Celestijnenlaan 200F, 3001 Leuven, Belgium

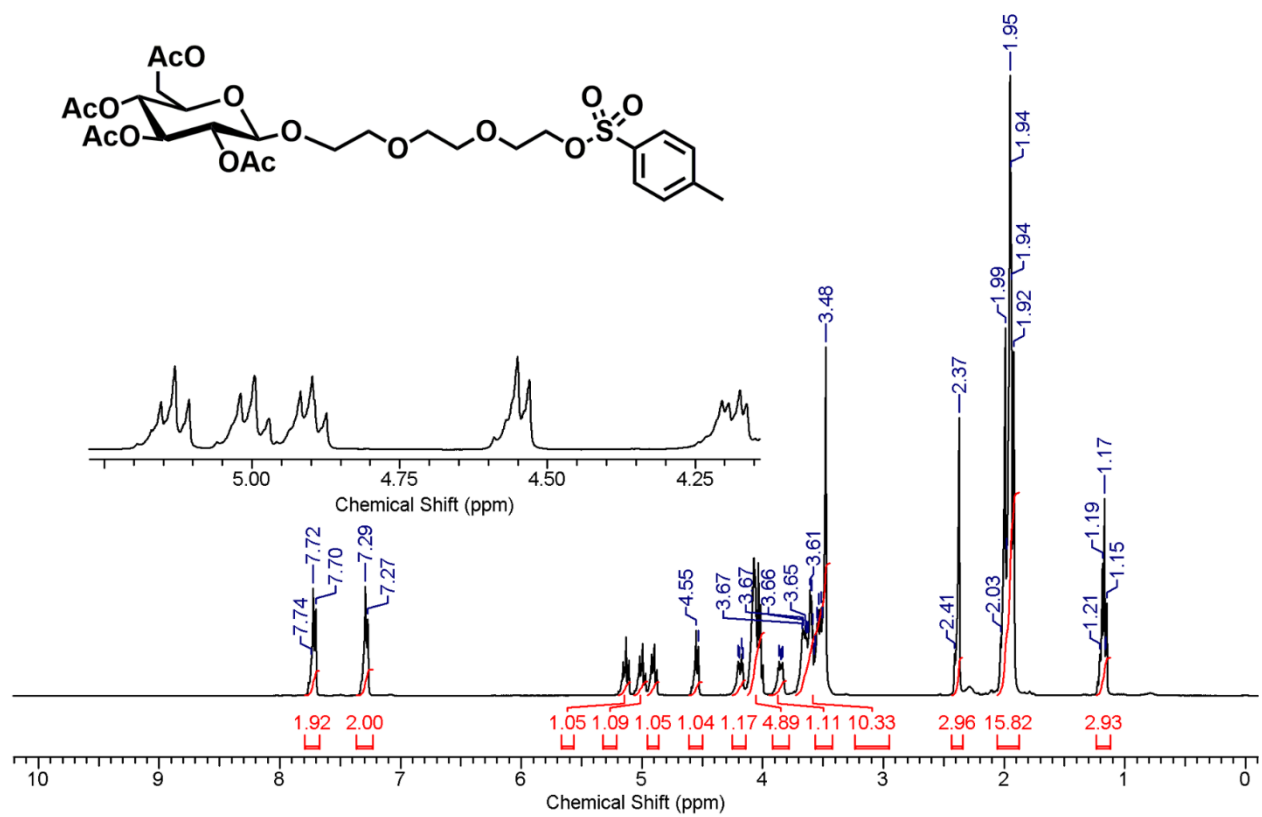
³ College of Basic education, Science department, Al-Muthanna University, 66001 Samawah, Al Muthanna. Iraq.

⁴ Chemistry Department, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia

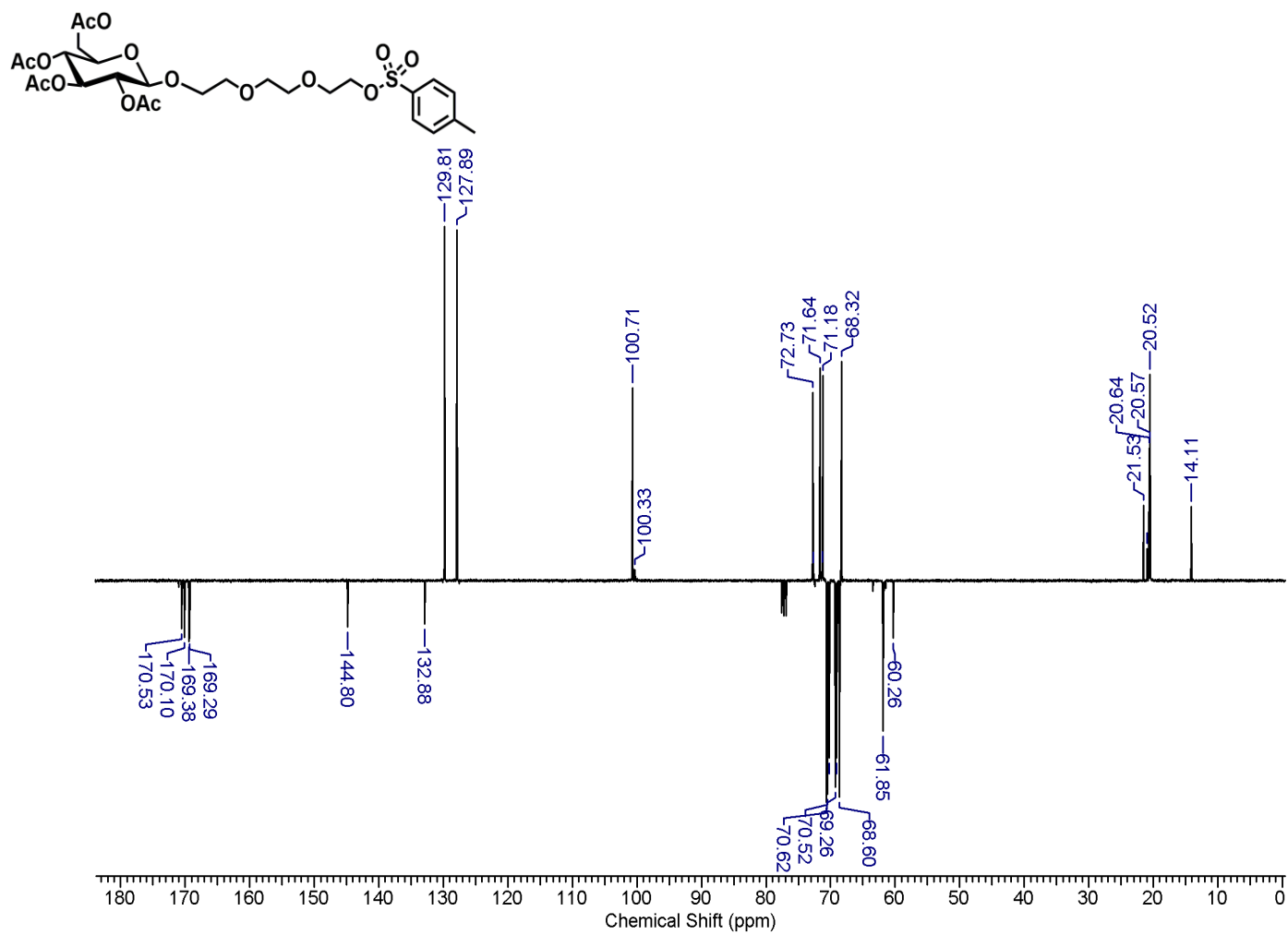
tammar86@gmail.com; heidelberg@um.edu.my



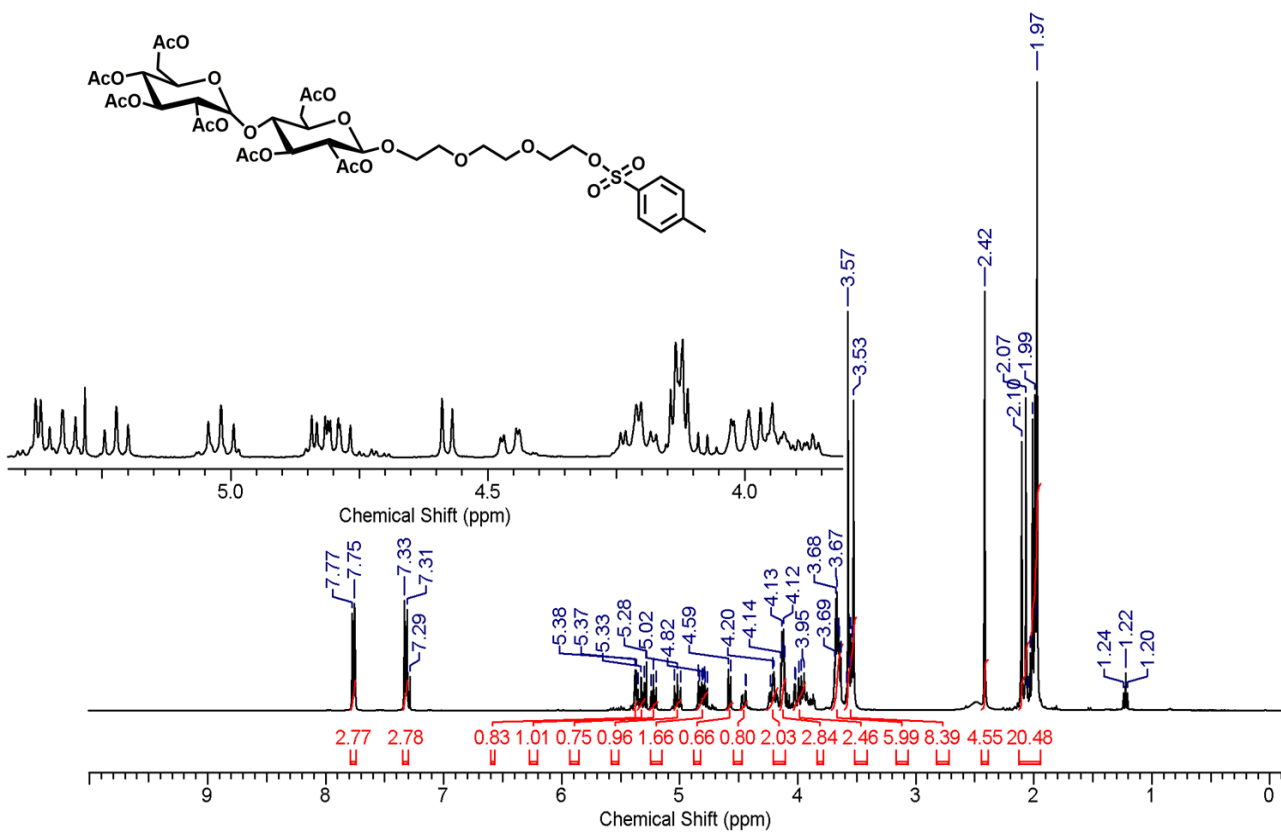
S 1: ¹H NMR of compound 3.



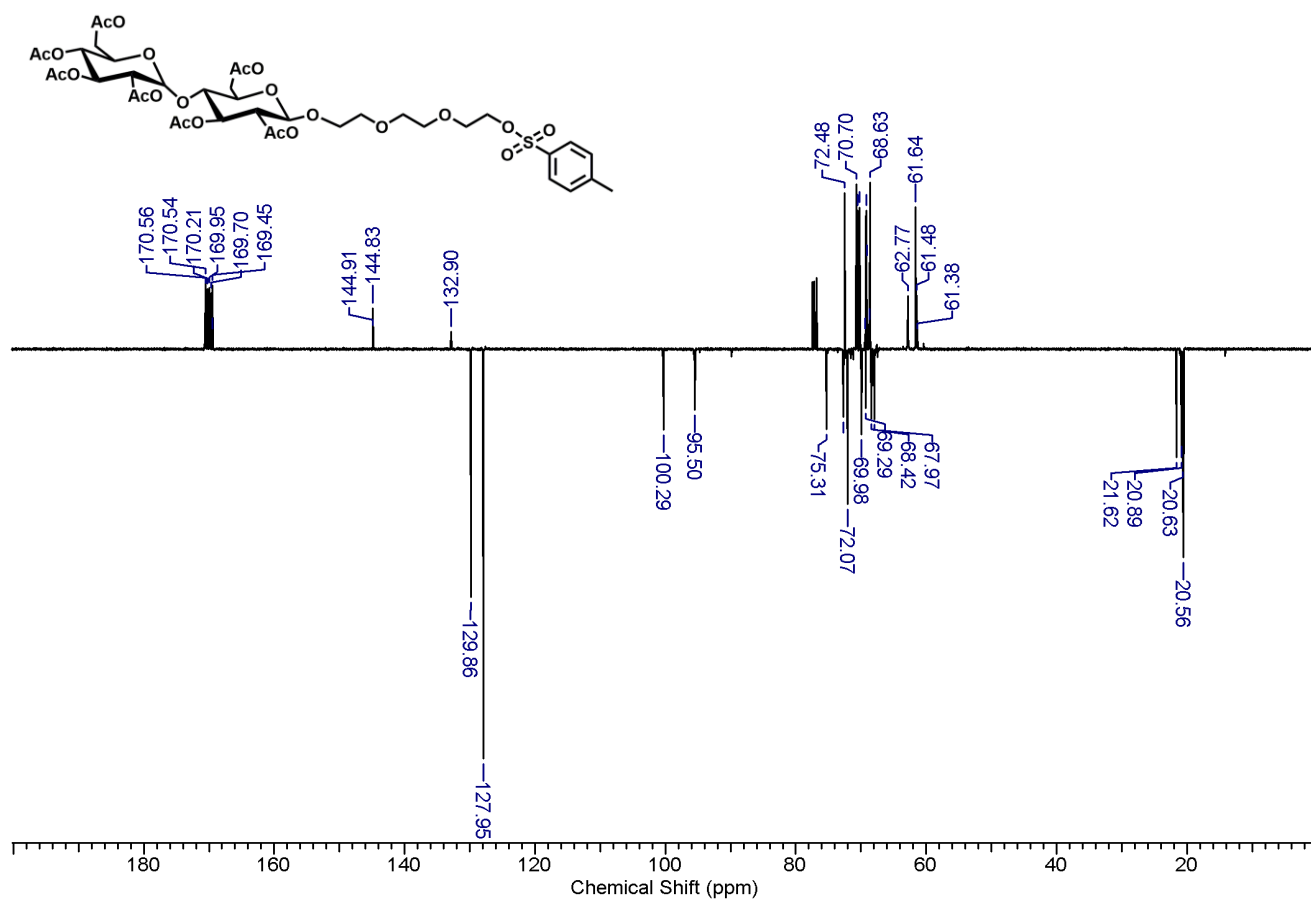
S 2: ¹H NMR of compound 5.



S 3: ^{13}C NMR of compound 5.



S 4: ¹H NMR of compound 7.

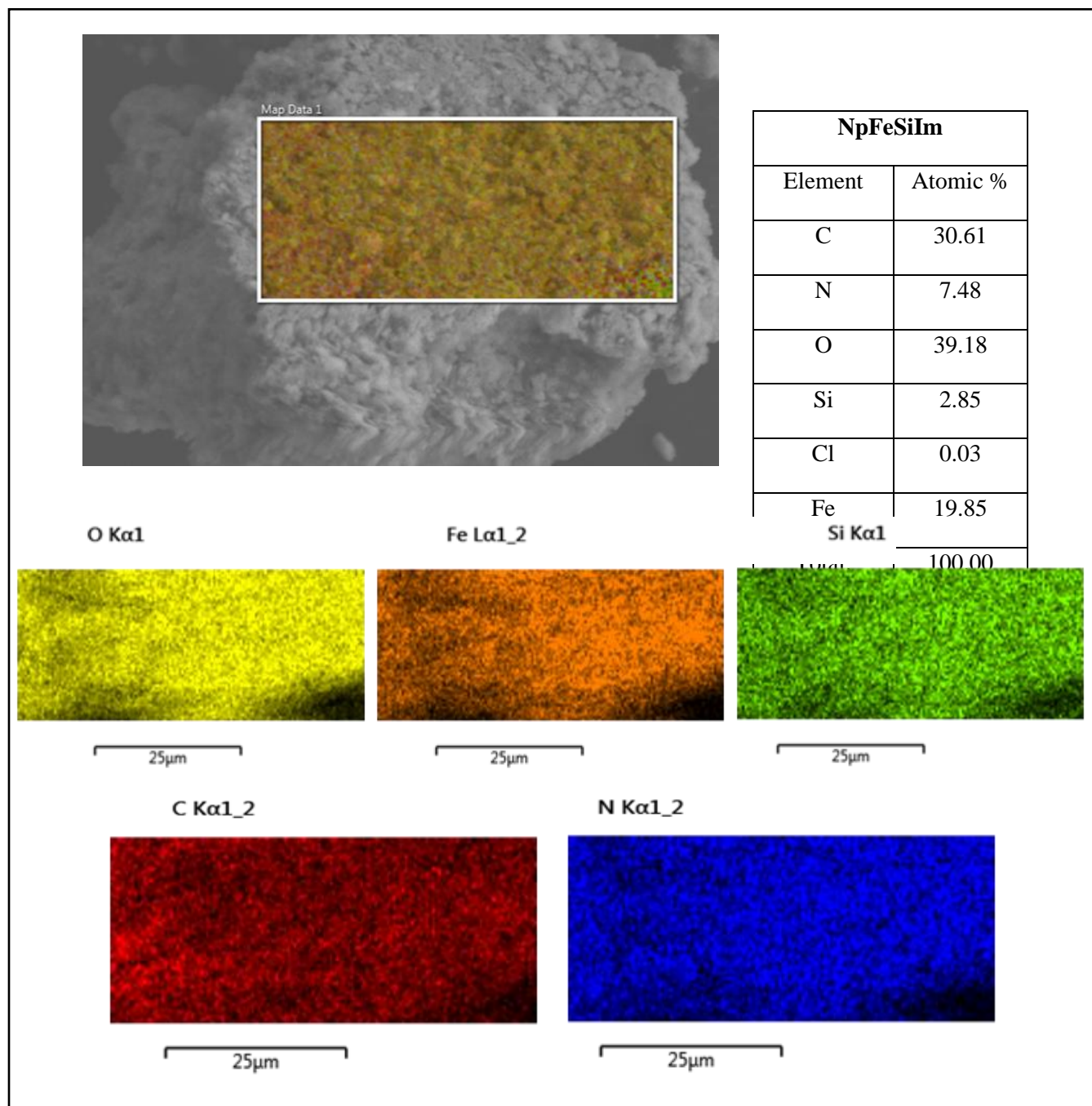


S 5: ^{13}C NMR of compound 7.

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

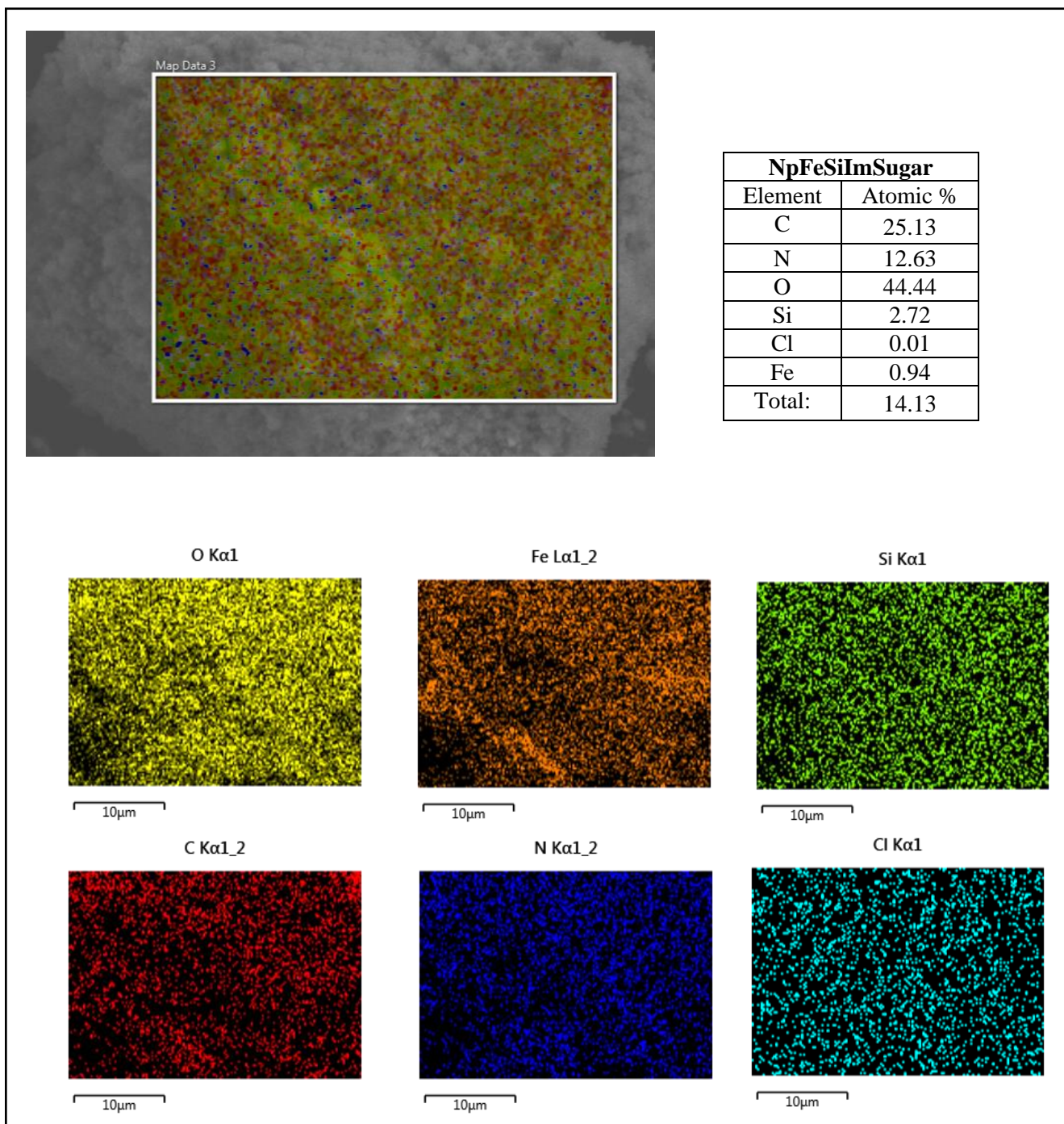
Hussen



Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

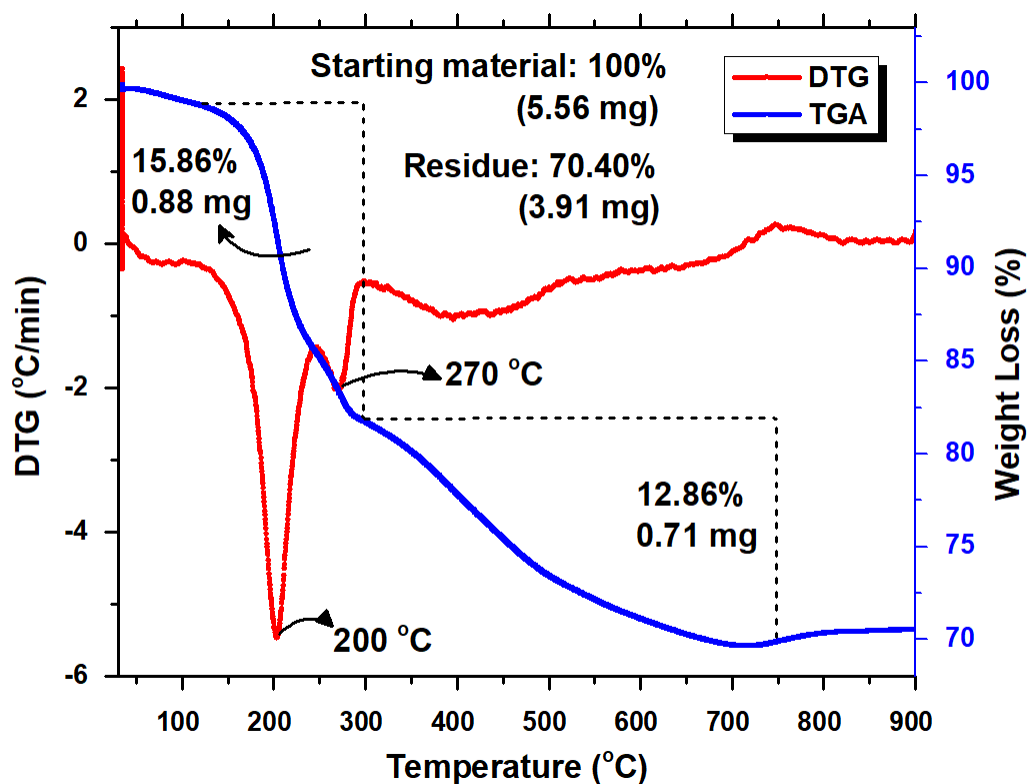


S 6: EDX analysis of surface functionalized nanoparticles NpFeSiIm and NpFeSiImSugar

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

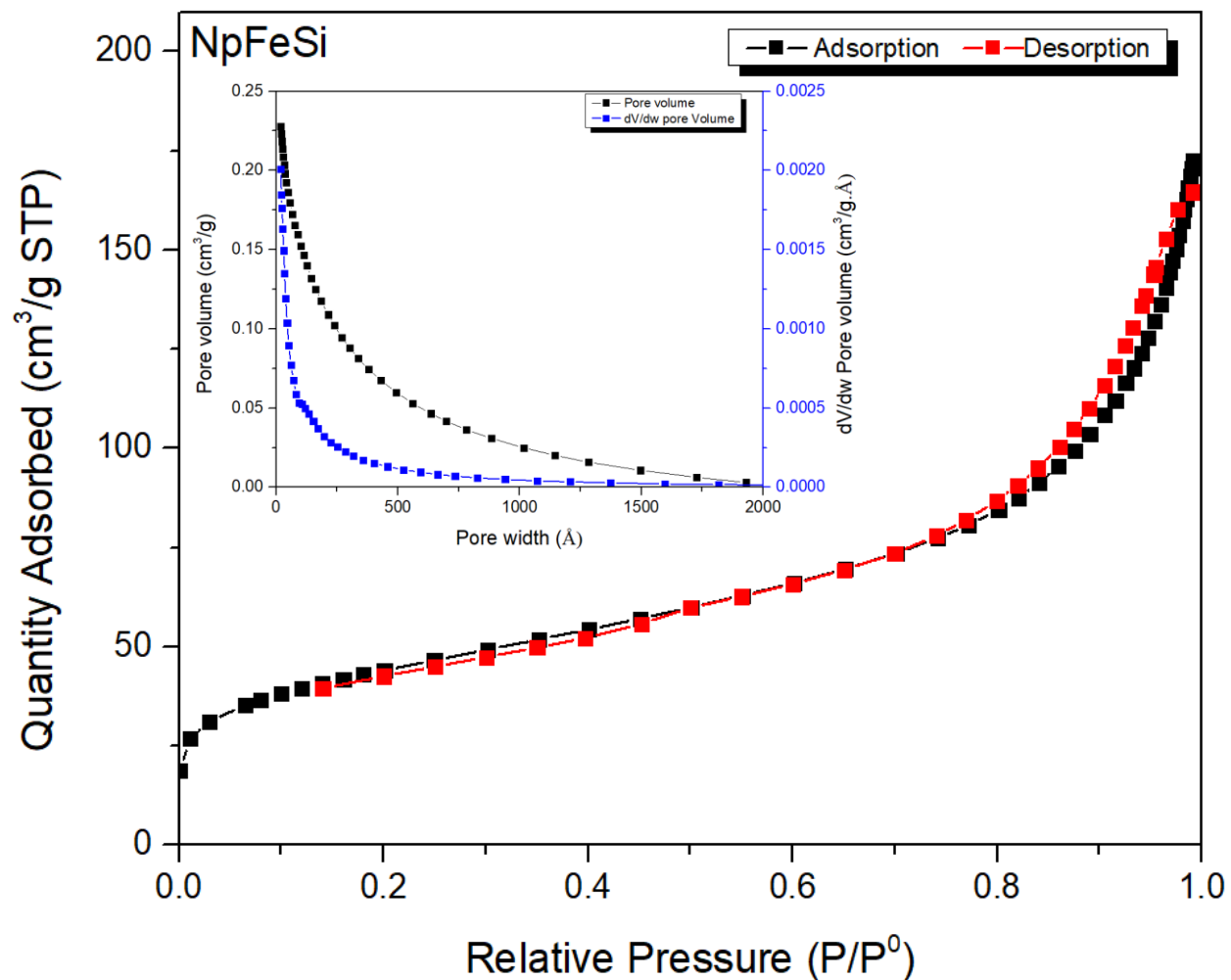


S 7: TG-DTA analysis of magnetic NpFeSiIm

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

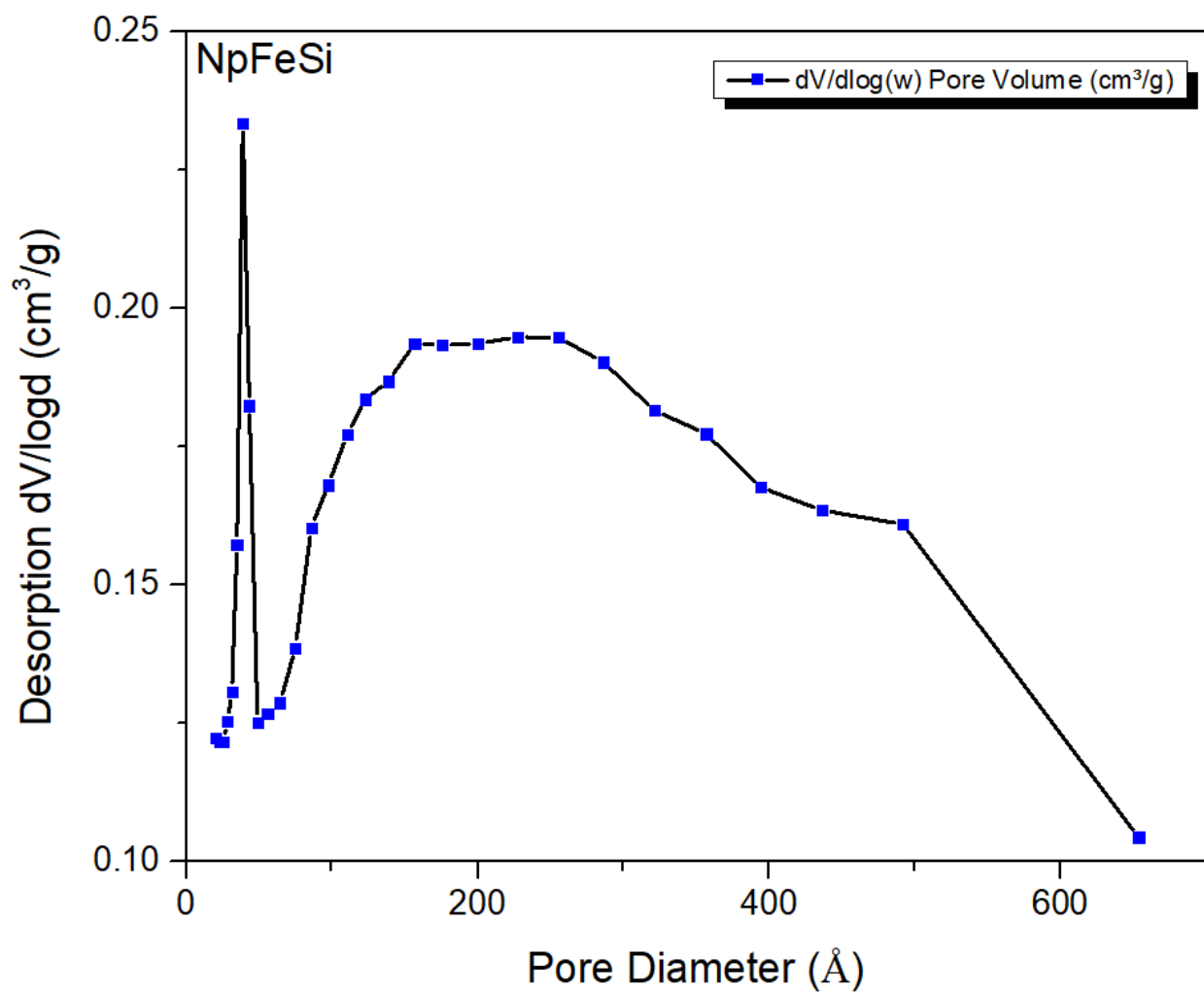


S 8: Nitrogen adsorption-desorption curve of NpFeSi nanoparticle. The inset shows pore volume profile

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

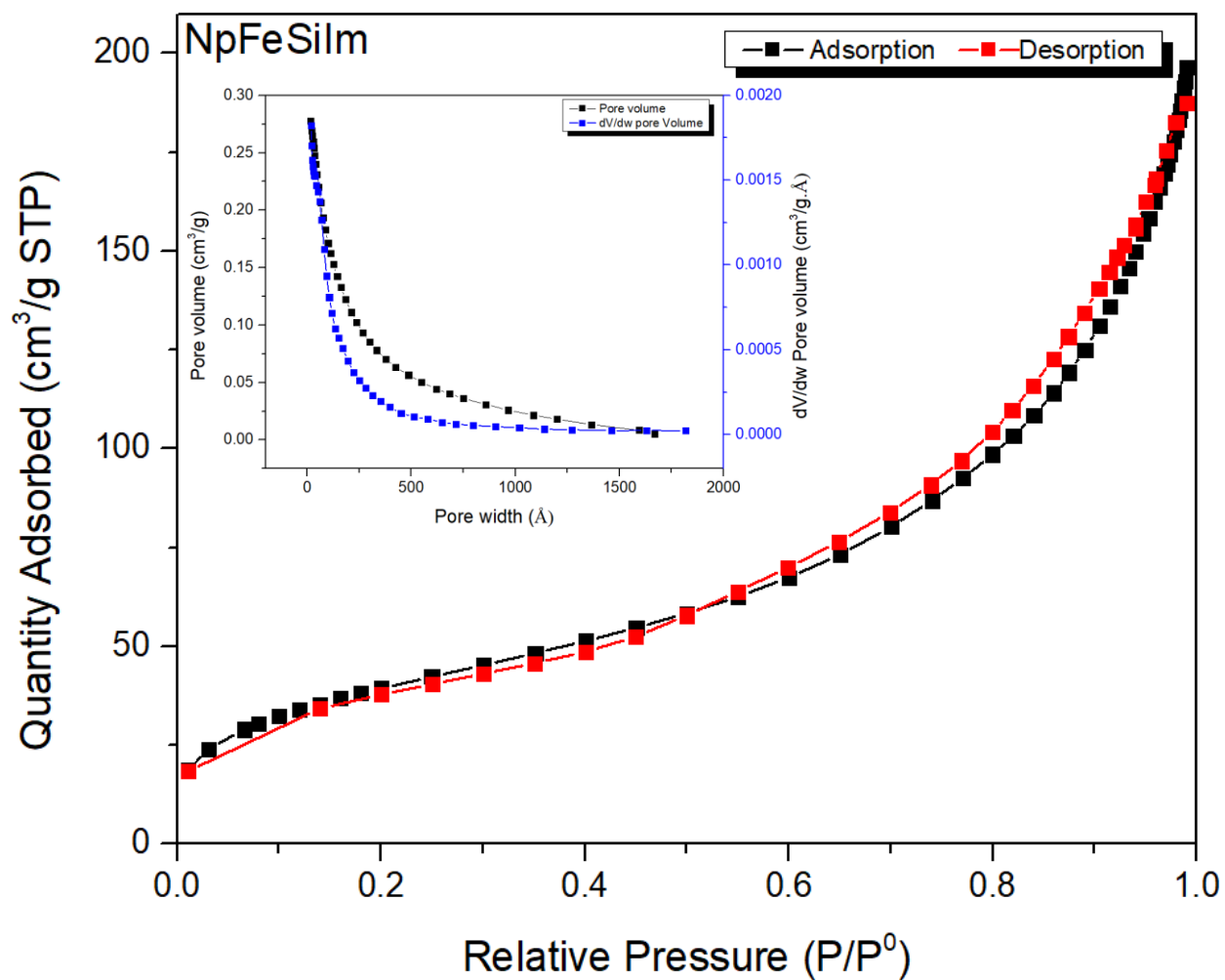


S 9: Shows pore size distribution profile of NpFeSi nanoparticles.

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

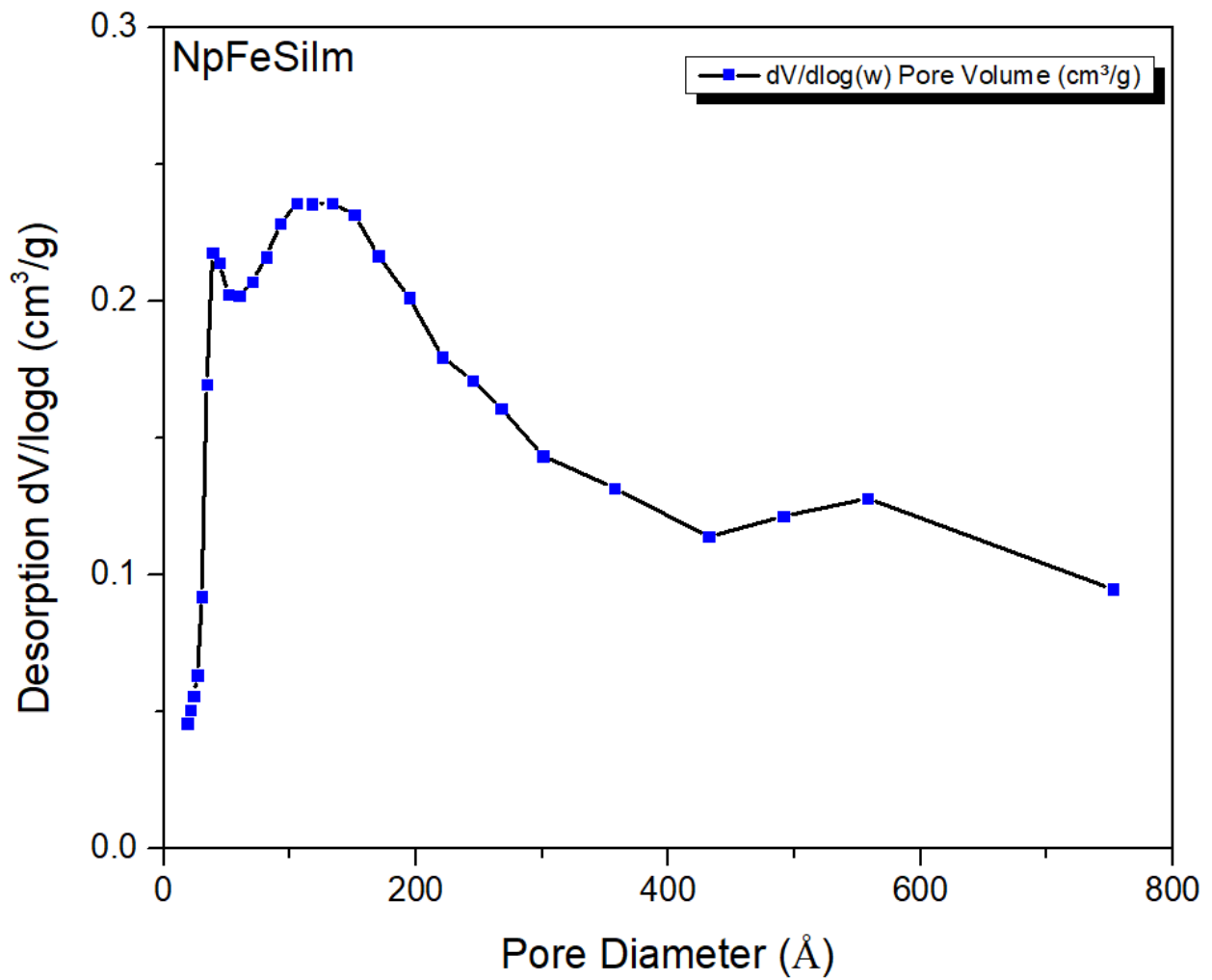


S 10: Nitrogen adsorption-desorption curve of NpFeSiIm nanoparticle. The inset shows pore volume profile

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali*

Hussen

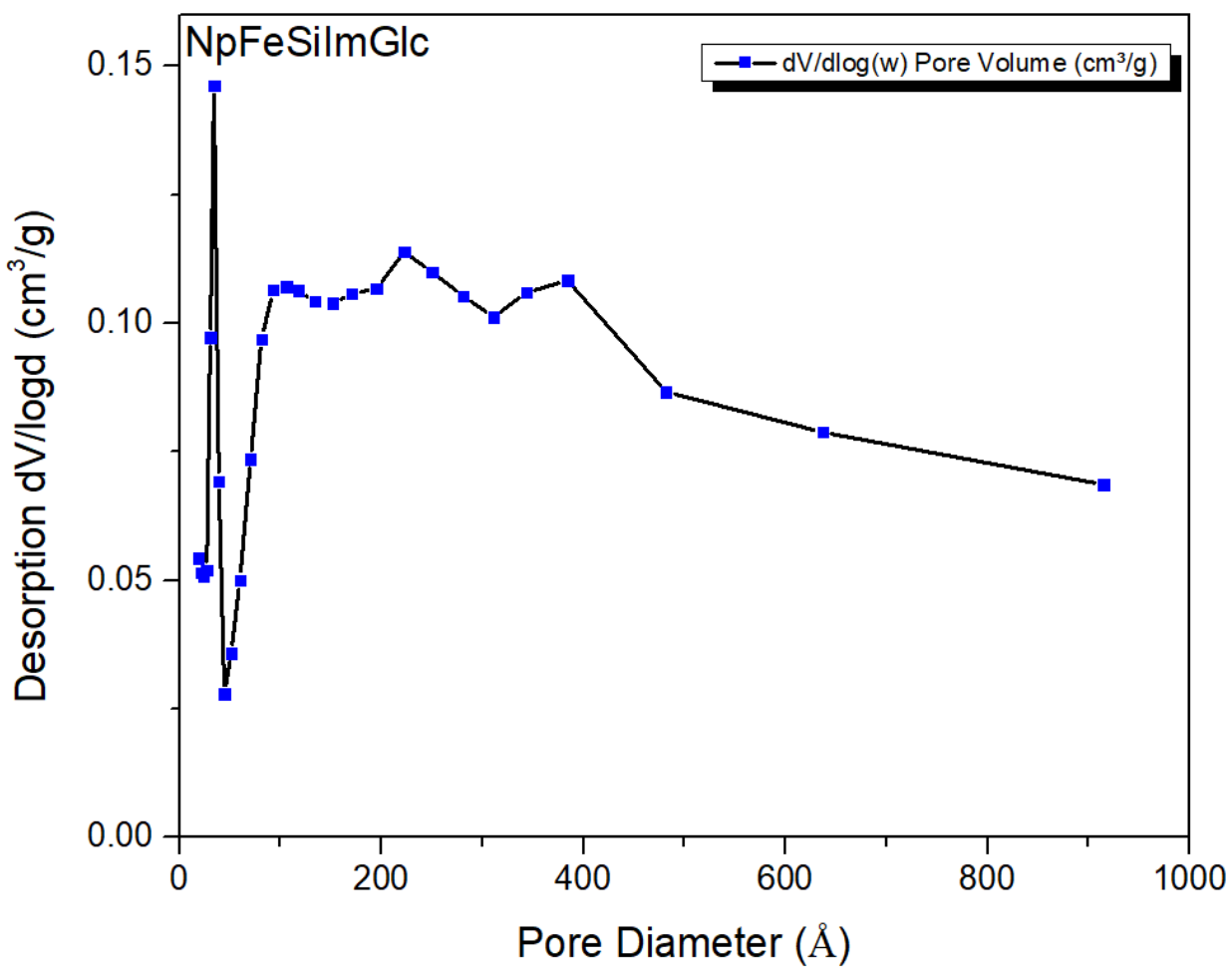


S 11: Shows pore size distribution profile of NpFeSiIm nanoparticles.

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen

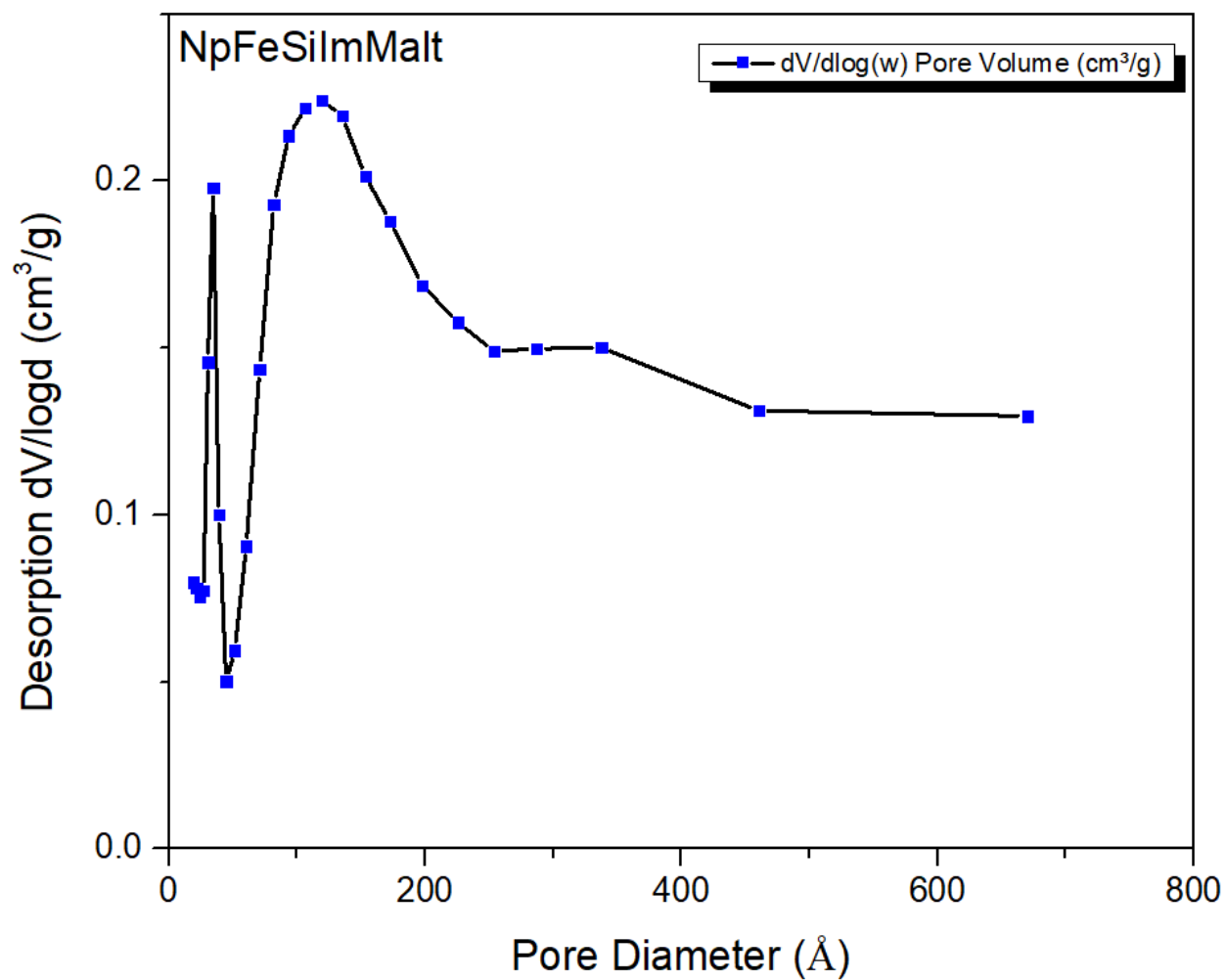


S 12: Shows pore size distribution profile of NpFeSiImGlc nanoparticles.

Sugar based cationic magnetic core-shell silica nanoparticles for nucleic acid extraction

Tammar Hussein Ali*, Amar Mousa Mandal, Thorsten Heidelberg, and Rusnah Syahila Duali

Hussen



S 13: Shows pore size distribution profile of NpFeSiImMalt nanoparticles.