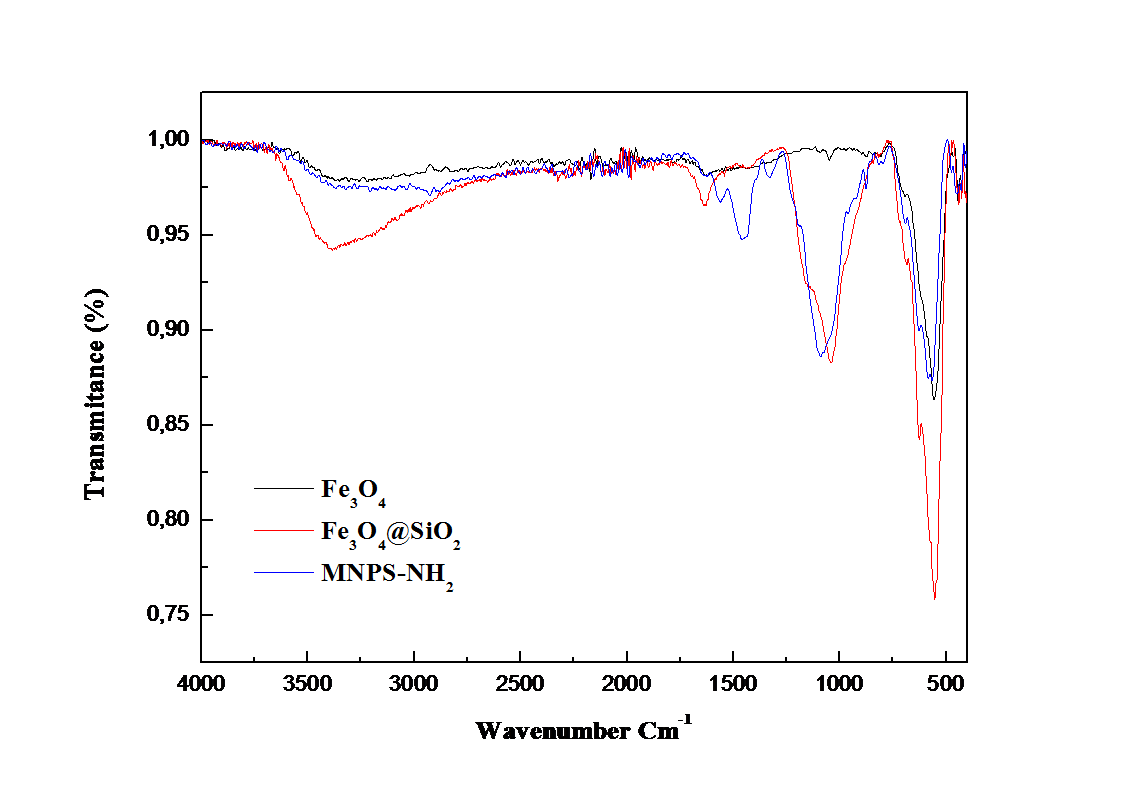
**Triazole containing magnetic core-silica shell nanoparticles for Pb2+, Cu2+ and Zn2+ removal**

Zakaria Mokadem,1 Sofiane Mekki,1 Salima Saïdi-Besbes,1\* Geraldine Agusti,2 Abdelhamid Elaissari2,Aicha Derdour1

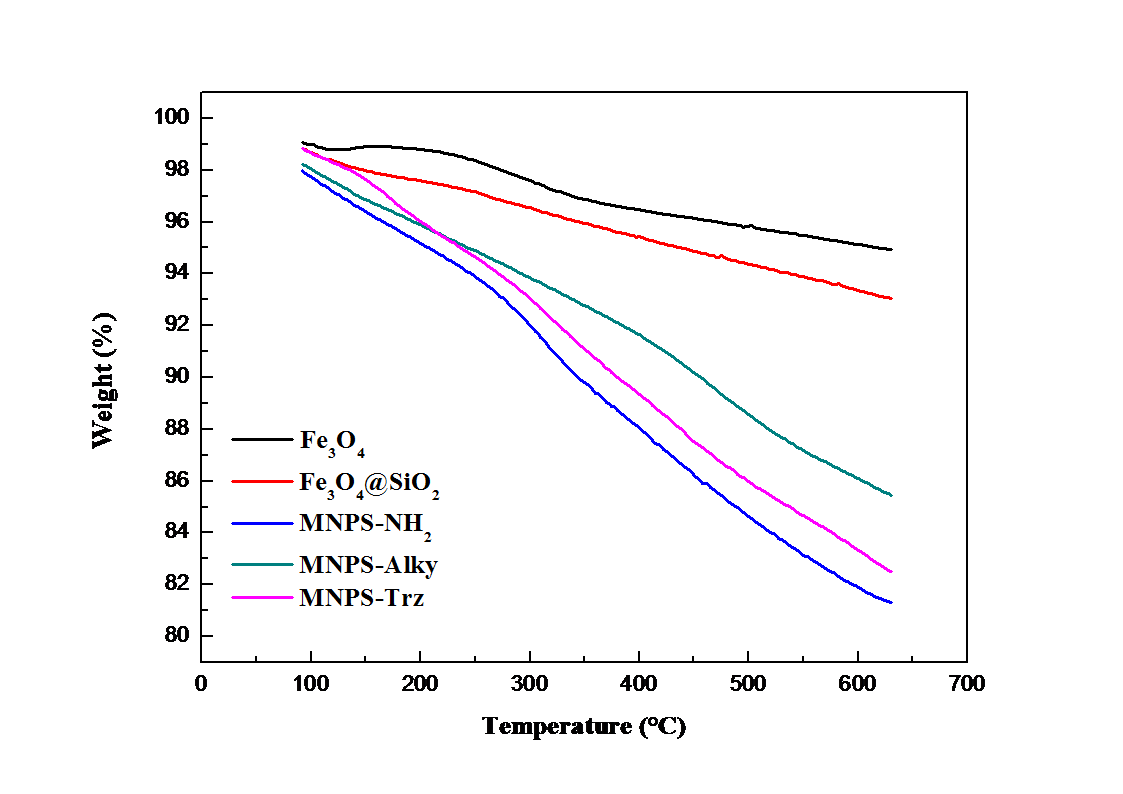
*1University Oran 1 Ahmed Benbella, Laboratoire de Synthèse Organique Appliquée (LSOA), Département de chimie, Faculté des sciences exactes et appliquées, BP 1524 EL Mnaouer, 31000 Oran – Algérie.*

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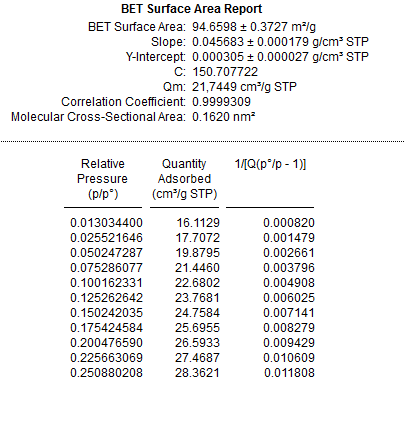
**Fig. S1.** FTIR spectra of MNPS magnetic nanoparticles.

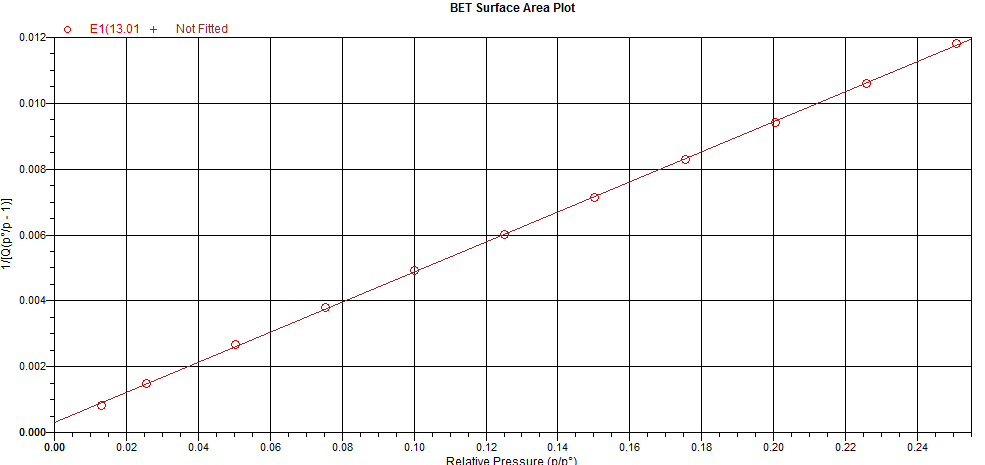


**Fig. S2.** TGA thermograms of MNPS magnetic nanoparticles

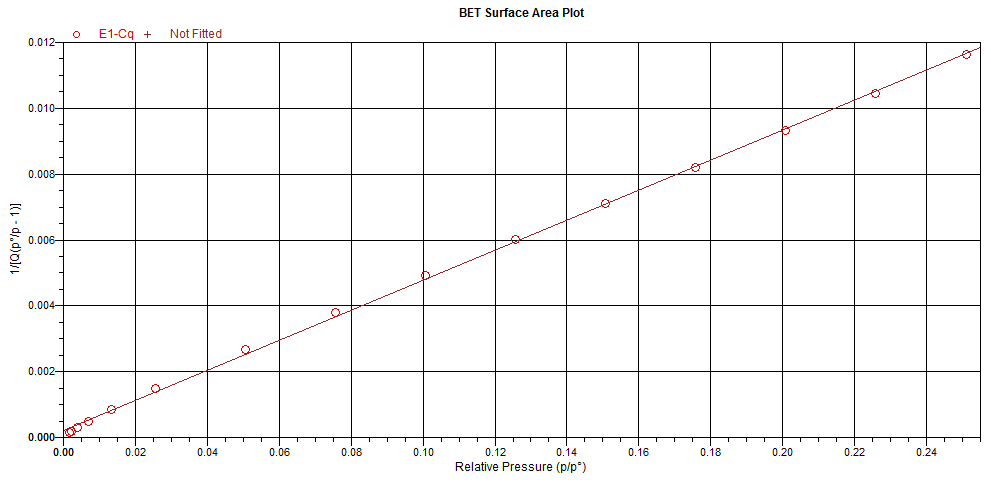
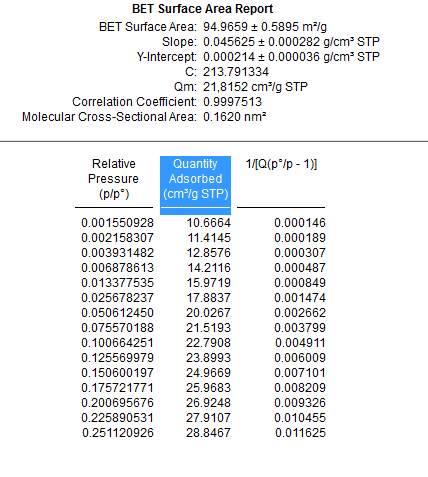


**Fig. S3.** Zeta potential of MNPS magnetic nanoparticles as function of pH in 1mM NaCl solution.

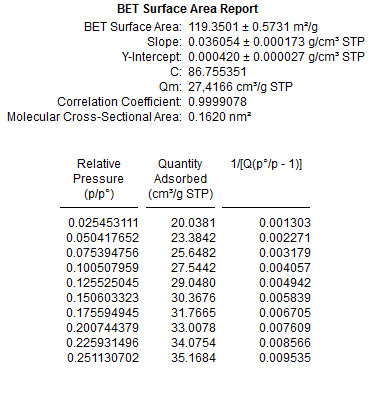
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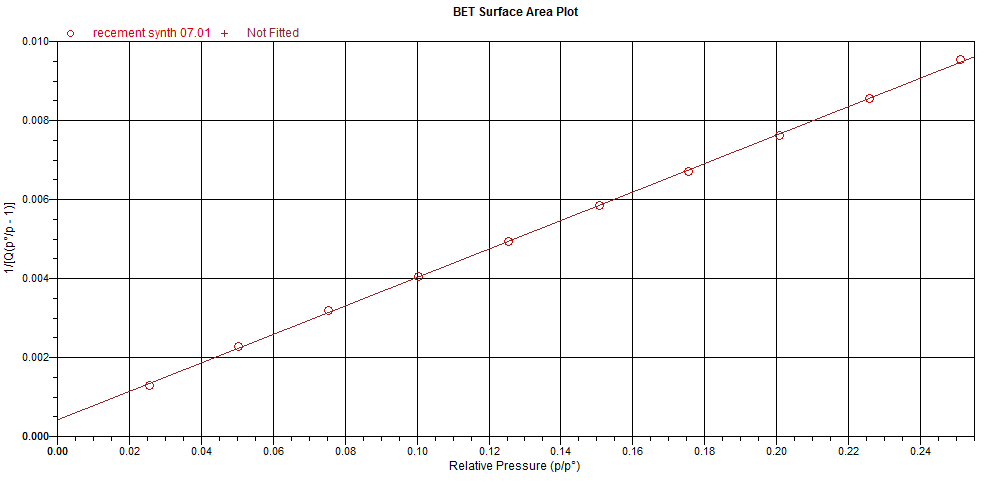
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**Fig.S4.** BET data of Fe3O4 MNPs



**Fig.S5.** BET data of Fe3O4@SiO2 MNPs





**Fig.S6.** BET data of MNP-Trz MNPs

**Table S1.** Overview of maximal adsorption capacity of various adsorbents for heavy metals

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sorbents** | **Adsorption capacity of ions (mg.g-1)** | | | **pH** | **Refs** |
| Cu2+ | Pb2+ | Zn2+ |
| Iron oxide nanoparticles | - | 36.0 | - | 5.5 | (Nassar 2010) |
| Amino-functionalized Fe3O4 @SiO2 core–shell magnetic nanomaterials | 29.84 | 76.66 | - | 6.2 | (Obata et al. 2008) |
| Magnetic particles modiﬁed with amino groups | 10.41 | - | - | 5.5 | (Lin et al. 2011) |
| Amino-functionalized magnetic nano-adsorbent | 12.4 | - | - | 5 | (Huang and Chen 2009) |
| Acrylic acid and crotonic acid copolymer-modiﬁed magnetic nanoparticles | 126.90 | 166.10 | 43.40 | 5.5 | (Ge et al. 2012) |
| Magnetic ϒ-Fe2O3 nanoparticles coated with poly-l-cysteine | 43.24 | 14.73 | 24. 59 | 7 | (White et al. 2009) |
| Amino-functionalized magnetic nanoparticles | 27.77 | - | - | 6 | (Hao et al. 2010) |
| Thiourea-modiﬁed magnetic chitosan microspheres | 66.70 | - | - | 5 | (Zhou et al. 2009) |
| Amino-functionalized Fe3O4 magnetic nanoparticles | - | 44.10 | - | 5 | (Tan et al. 2012) |
| Silica-supported dithiocarbamate magnetic particles | 20.36 | 70.40 | - | 5 | (Bai et al. 2011) |
| Gum Arabic modiﬁed magnetic nano-adsorbents | 38.50 | - | - | 5.1 | (Banerjee and Chen 2007) |
| Chitosan/magnetite composite beads | - | 63.30 | - | 6 | (Ray and Shipley 2015) |
| Glutaraldehyde magnetic nanoparticles | 61.07 | - | - | 4 | (Ozmen et al. 2010) |
| Carboxymethyl-β-cyclodextrin conjugated magnetic nanoparticles | 47.30 | - | - | 6 | (Badruddoza et al. 2011) |
| Xanthate-modiﬁed magnetic chitosan | 34.50 | 76.90 | 20.80 | 5 | (Zhu et al. 2012) |
| Aminodextran magnetic colloidal particles  Graphene oxide nanosheets decorated with Fe3O4 nanoparticles  Magnetic hydrogels | 11.62  18.26  105.61 | 100  -  126.40 | 40  - | 5  5.3 | (Chaabouni et al. 2013)  (Li et al. 2012)  (Ozay et al. 2010) |
| Triazole functionalized magnetic particles | 87.87 | 167.78 | 51.20 | 5.5 | this work |

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