

## REFERENCES

1. Cao, C.; Li, X.; Lee, J.; Sim, S. J., Homogenous growth of gold nanocrystals for quantification of PSA protein biomarker. *Biosens. Bioelectron.* **2009**, *24* (5), 1292-1297.
2. Afonso, A. S.; Zanetti, B. F.; Santiago, A. C.; Henrique-Silva, F.; Mattoso, L. H. C.; Faria, R. C., QCM immunoassay for recombinant cysteine peptidase: A potential protein biomarker for diagnosis of citrus canker. *Talanta* **2013**, *104*, 193-197.
3. Nguyen, H. P.; Chandel, N. S.; DeBerardinis, R. J.; Schug, K. A., Hydrophilic interaction liquid chromatography coupled with MS/MS to detect and quantify dicarboxyethyl glutathione, a metabolic biomarker of the fumarate hydratase deficient cancer cell. *Journal of Separation Science* **2013**, *36* (20), 3303-3309.
4. Brewer, M.; Utzinger, U.; Li, Y.; Atkinson, E. N.; Satterfield, W.; Auersperg, N.; Richards-Kortum, R.; Follen, M.; Bast, R., Fluorescence spectroscopy as a biomarker in a cell culture and in a nonhuman primate model for ovarian cancer chemopreventive agents. *Journal of Biomedical Optics* **2002**, *7* (1), 20-26.
5. Grant, C. S.; Louda, J. W., Scytonemin-imine, a mahogany-colored UV/Vis sunscreen of cyanobacteria exposed to intense solar radiation. *Organic Geochemistry* **2013**, *65*, 29-36.
6. Li, T.; Shu, B.; Jiang, B.; Ding, L.; Qi, H. Z.; Yang, M. H.; Qu, F. L., Ultrasensitive multiplexed protein biomarker detection based on electrochemical tag incorporated polystyrene spheres as label. *Sensors and Actuators B-Chemical* **2013**, *186*, 768-773.
7. Wang, Y.; Wu, L.; Zhou, X. D.; Wong, T. I.; Zhang, J. L.; Bai, P.; Li, E. P.; Liedberg, B., Incident-angle dependence of fluorescence enhancement and biomarker

immunoassay on gold nanohole array. *Sensors and Actuators B-Chemical* 2013, 186, 205-211.

8. Kuo, T. R.; Chen, J. S.; Chiu, Y. C.; Tsai, C. Y.; Hu, C. C.; Chen, C. C., Quantitative analysis of multiple urinary biomarkers of carcinoid tumors through gold-nanoparticle-assisted laser desorption/ionization time-of-flight mass spectrometry. *Analytica Chimica Acta* 2011, 699 (1), 81-86.

9. Chiang, C. K.; Chiang, N. C.; Lin, Z. H.; Lan, G. Y.; Lin, Y. W.; Chang, H. T., Nanomaterial-based surface-assisted laser desorption/ionization mass spectrometry of peptides and proteins. *Journal of the American Society for Mass Spectrometry* 2010, 21 (7), 1204-1207.

10. Shrivastava, K.; Wu, H. F., Applications of silver nanoparticles capped with different functional groups as the matrix and affinity probes in surface-assisted laser desorption/ionization time-of-flight and atmospheric pressure matrix-assisted laser desorption/ionization ion trap mass spectrometry for rapid analysis of sulfur drugs and biothiols in human urine. *Rapid Communications in Mass Spectrometry* 2008, 22 (18), 2863-2872.

11. Boyes, S. G.; Akgun, B.; Brittain, W. J.; Foster, M. D., Synthesis, characterization, and properties of polyelectrolyte block copolymer brushes prepared by atom transfer radical polymerization and their use in the synthesis of metal nanoparticles. *Macromolecules* 2003, 36 (25), 9539-9548.

12. Zhou, X.; Boey, F.; Huo, F.; Huang, L.; Zhang, H., Chemically functionalized surface patterning. *Small* 2011, 7 (16), 2273-2289.

13. Dong, R.; Krishnan, S.; Baird, B. A.; Lindau, M.; Ober, C. K., Patterned biofunctional poly(acrylic acid) brushes on silicon surfaces. *Biomacromolecules* 2007, 8 (10), 3082-3092.
14. Jensen, J.; Dyer, A. L.; Shen, D. E.; Krebs, F. C.; Reynolds, J. R., Direct photopatterning of electrochromic polymers. *Advanced Functional Materials* 2013, 23 (30), 3728-3737.
15. Flavel, B. S.; Sweetman, M. J.; Shearer, C. J.; Shapter, J. G.; Voelcker, N. H., Micropatterned arrays of porous silicon: Toward sensory biointerfaces. *ACS Applied Materials & Interfaces* 2011, 3 (7), 2463-2471.
16. Zhou, Z.; Yu, P.; Geller, H. M.; Ober, C. K., Biomimetic polymer brushes containing tethered acetylcholine analogs for protein and hippocampal neuronal cell patterning. *Biomacromolecules* 2013, 14 (2), 529-537.
17. Goudar, V. S.; Suran, S.; Varma, M. M., Photoresist functionalisation method for high-density protein microarrays using photolithography. *Micro & Nano Letters* 2012, 7 (6), 549-553.
18. Ren, D.; Xia, Y.; Wang, J.; You, Z., Micropatterning of single cell arrays using the PEG-silane and biotin-(Strept)avidin system with photolithography and chemical vapor deposition. *Sensors and Actuators B-Chemical* 2013, 188, 340-346.
19. Zhao, B.; Brittain, W. J., Polymer brushes: Surface-immobilized macromolecules. *Progress in Polymer Science* 2000, 25 (5), 677-710.
20. Barbey, R.; Lavanant, L.; Paripovic, D.; Schuewer, N.; Sugnaux, C.; Tugulu, S.; Klok, H.-A., Polymer brushes via surface-initiated controlled radical polymerization: Synthesis, characterization, properties, and applications. *Chemical Reviews* 2009, 109 (11), 5437-5527.

21. Sumerlin, B. S.; Lowe, A. B.; Stroud, P. A.; Zhang, P.; Urban, M. W.; McCormick, C. L., Modification of gold surfaces with water-soluble (co)polymers prepared via aqueous reversible addition-fragmentation chain transfer (RAFT) polymerization. *Langmuir* 2003, 19 (14), 5559-5562.
22. Shan, J.; Nuopponen, M.; Jiang, H.; Kauppinen, E.; Tenhu, H., Preparation of poly(N-isopropylacrylamide)-monolayer-protected gold clusters: Synthesis methods, core size, and thickness of monolayer. *Macromolecules* 2003, 36 (12), 4526-4533.
23. Zhu, M. Q.; Wang, L. Q.; Exarhos, G. J.; Li, A. D. Q., Thermosensitive gold nanoparticles. *Journal of the American Chemical Society* 2004, 126 (9), 2656-2657.
24. Akkhat, P.; Hoven, V. P., Introducing surface-tethered poly(acrylic acid) brushes as 3D functional thin film for biosensing applications. *Colloids and Surfaces B-Biointerfaces* 2011, 86 (1), 198-205.
25. Ji, J.; Jia, L.; Yan, L.; Bangal, P. R., Efficient synthesis of poly(acrylic acid) in aqueous solution via a RAFT process. *Journal of Macromolecular Science Part a-Pure and Applied Chemistry* 2010, 47 (5), 445-451.
26. Qu, Z.; Hu, F.; Chen, K.; Duan, Z.; Gu, H.; Xu, H., A facile route to the synthesis of spherical poly(acrylic acid) brushes via RAFT polymerization for high-capacity protein immobilization. *Journal of Colloid and Interface Science* 2013, 398, 82-87.
27. Chiu, Y.-C.; Chen, Y.-C., Carboxylate-functionalized iron oxide nanoparticles in surface-assisted laser desorption/ionization mass spectrometry for the analysis of small biomolecules. *Analytical Letters* 2008, 41 (2), 260-267.
28. Tarui, A.; Kawasaki, H.; Taiko, T.; Watanabe, T.; Yonezawa, T.; Arakawa, R., Gold-nanoparticle-supported silicon plate with polymer micelles for surface-assisted

laser desorption/ionization mass spectrometry of peptides. *Journal of Nanoscience and Nanotechnology* 2009, 9 (1), 159-164.

29. Aminlashgari, N.; Shariatgorji, M.; Ilag, L. L.; Hakkarainen, M., Nanocomposites as novel surfaces for laser desorption ionization mass spectrometry. *Analytical Methods* 2011, 3 (1), 192-197.

30. Bai, J.; Li, Y.; Du, J.; Wang, S.; Zheng, J.; Yang, Q.; Chen, X., One-pot synthesis of polyacrylamide-gold nanocomposite. *Materials Chemistry and Physics* 2007, 106 (2-3), 412-415.

31. Woo, S.; Jeong, J. H.; Lyu, H. K.; Han, Y. S.; Kim, Y., In situ-prepared composite materials of PEDOT: PSS buffer layer-metal nanoparticles and their application to organic solar cells. *Nanoscale Research Letters* 2012, 7.

32. Akkahat, P.; Mekboonsonglarp, W.; Kiatkamjornwong, S.; Hoven, V. P., Surface-Grafted poly(acrylic acid) brushes as a precursor layer for biosensing applications: Effect of graft density and swellability on the detection efficiency. *Langmuir* 2012, 28 (11), 5302-5311.

33. Carr, J. A.; Wang, H.; Abraham, A.; Gullion, T.; Lewis, J. P., L-cysteine interaction with Au-55 nanoparticle. *J. Phys. Chem. C* 2012, 116 (49), 25816-25823.

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