CHAPTER V

CONCLUSION AND SUGGESTIONS

The present study has demonstrated that patterned PAA brushes can be generated by photolithography and surface-initiated RAFT polymerization of AA. The success of PAA brushes formation was verified by contact angle measurements, FT-IR and XPS analysis. The AuNPs can be generated *in situ* within the matrix of PAA brushes without the use of additional reducing agent. TEM analysis suggested that the AuNPs existed both in the well dispersed spherical particles having an approximate diameter of 18.45 $\pm$ 2.34 nm and aggregated particles. Under the conditions used in this research, the coverage of AuNPs as estimated by ICP-MS was 2.46×10^{-9} mol/cm^2. The PAA brushes embedded with AuNPs can be used as substrate for SALDI-MS analysis which is capable of detecting both small peptide having m/z $\leq$ 600 (glutathione) and large peptides having m/z $\geq$ 1000 (bradykinin, ICNKQDCPILE) without the interference from matrix signal. Moreover, by employing AuNPs as the capture probe, PAA brushes substrate containing AuNPs can selectively identified thiol-containing peptides (glutathione, ICNKQDCPILE) from the peptide mixtures with LOD as low as 0.1 nM and 0.05 nM for glutathione and ICNKQDCPILE, respectively. It should also be emphasized that the analysis can be accomplished without the requirement for extra proton source because carboxyl groups of PAA brushes can serve as internal proton source. The superior performance of the developed substrate to that of the AuNPs alone strongly suggested that it should potentially be applied for trace analysis of other biomolecules. The patterned format should also afford high throughput analysis.