Simple fabrication of a hydrophobic surface target by coating for increased sensitivity and homogeneity in MALDI-TOF analysis of peptides and phosphopeptides

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Abstract

In this study, a simple method to improve sample signals and sample homogeneity on a MALDI plate was developed. The PDMS polymer was coated on the stainless steel MALDI plate to form a transparent and hydrophobic surface to enhance sample signals without producing observable mass background signals. In the analysis of tryptic peptides with CHCA matrix, due to the reduced sample spot area and the absence of crystal ring, peptide signals were enhanced by ~5-19 folds compared to the use of unmodified stainless steel plate. In the analysis of phosphopeptide with DHB matrix by MS imaging analysis, the most reduced spot area was present when the sample solution contains less than 30% ACN and showed more sample homogeneity with ~5.2-8.2 folds in signal enhancement compared to the use of unmodified stainless less plate. The PDMS-coated approach could be a practical and an attractive method to improve sample signals and be applied in diverse commercial MALDI plates. The PDMS film coated on the plate is easily to be removed and refabricated to avoid sample carryover. The PDMS-coated plate could also be high potential for other sample and matrix system to improve sample sensitivity and homogeneity.