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Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Introduction -- Online sample injection and multidimensional chromatography separation by using strong cation exchange monolithic column -- Development of polymer-based hydrophobic monolithic columns and their applications in proteome analysis -- Large-scale proteome and phosphoproteome quantification by using dimethylation isotope labeling.
Sommario/riassunto	In this thesis, the author outlines the development of new monolithic columns and isotope dimethyl labeling strategies and their applications in high-performance proteome analyses. Though different types of monolithic columns have been widely developed for chromatography and electrophoresis separation, their application in proteomics for complex peptide mixtures separation is still a challenge. The author discusses the preparation of new monolithic columns and optimization of chromatography separation capability to improve coverage and accuracy of proteome analysis. Further, the author describes a novel online multidimensional chromatography system combined with automated online isotope labeling, which significantly improves the throughput, sensitivity, and accuracy of quantitative proteomics. In addition to the development of new technologies, the author investigates the proteome and phosphoproteome expression changes of clinical hepatocellular carcinoma tissues and the hippocampi of mice with Alzheimer's disease. The work in this thesis has led to several

publications in high-profile journals in the fields of analytical chemistry  
and proteome research.

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