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## Rational synthesis of MoS<sub>2</sub>-based immobilized trypsin for rapid and effective protein digestion

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**Abstract:** In this work, a novel MoS<sub>2</sub>-based immobilized trypsin reactor was designed and prepared. Pyrene-1-butyric acid was first assembled onto MoS<sub>2</sub> nanosheets *via* the strong  $\pi$ - $\pi$  stacking and then trypsin was covalently immobilized onto the nanocomposite supports through amidation reaction. Compared with traditional in-solution digestion, higher sequence coverage (84%) and shorter time (5 min) could be achieved by the novel trypsin reactor during the digestion of BSA. The excellent performances of as-prepared trypsin reactor can be mainly attributed to the designed novel structure of the composites with high surface area resulting in high enzyme loading. In addition, strong reusability, good reproducibility and long storage of the

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