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Recyclable Hypersensitive Fluorescent Dipeptidyl Chemosensor Based on Silica Nanoparticles Using Signal Amplification for the Detection of Hg(II) and Cu(II) in Aqueous Solutions

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Abstract

Silica nanoparticles (SiNPs) were synthesized for the detection of heavy metal ions by conjugating a dipeptidyl fluorescent chemosensor (DPN) into the SiNPs using a click reaction. Among the 14 metal ions tested, SiNPs conjugated with DPN (DPNSi) showed sensitive responses toward Hg(II) and Cu(II) ions in aqueous solutions. The detection limits of DPNSi were determined to be 3.8 and 16.5 nM for Hg(II) and Cu(II) ions, respectively, in aqueous solutions. Moreover, the sensitivity of DPNSi to Hg(II) ions was significantly higher than that of DPN. DPNSi was sufficiently sensitive for monitoring the maximum allowable level of Hg(II) and Cu(II) ions in drinking water demanded by the Environmental Protection Agency (EPA). DPNSi could be recycled for the detection and removal of toxic mercury ions in aqueous solutions by regeneration with glutathione.

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```

```
var _prum=[[['id','59e8fecb3847311aab7b23c6'],['mark','firstbyte',(new Date()).getTime()]];function(){var s=document.getElementsByTagName('script')[0],p=document.createElement('script');p.async='async';p.src="//rum-static.pingdom.net/prum.min.js";s.parentNode.insertBefore(p,s);})();
```