The elemental composition and chemical status of the obtainedphotocatalysts was studied by XPS, as exhibited in Figs. 2 and s2.Fig.2a-f is the XPS spectrum of the individual element, including thesignal of C, N,O, Mg, In, and S. The XPS spectrum of C 1s (Fig. 2a) forOCN could be divided into three peaks located at 284.8 ev, 286.45 ev,and 288.0 ev. While in the case of OCM3, these three peaks are at284.8 eV,286.50 eV, and 288.3 eV. These three peaks can be indexedinto the adventitious carbon, C-O bond (Oh et al., 2015; Fu et al., 2014),and N—C-N type aromatic carbons (Yu et al., 2017).For N 1s (Fig.2b),the XPS spectrum of OCN can be deconvoluted into three peaks at398.5 eV,399.8 ev, and 400.9 ev, respectively, while deconvolution ofN 1s spectrum for OCM3 are at 398.9 ev,400.1 ev,and 401.2 ev,respectively. These three peaks belong to the C-N—C, N-(C)3, and N-H(Zhang et al.， 2012).As for the O 1s spectrum in OCN (Fig.2c), thedeconvolution of the peaks is located at 530.7 ev,531.9 ev,and533.2 eV，respectively. While in OCM3， the divided peaks are at530.7 ev,532.3 ev, and 533.6 eV, respectively, which belong to C=o(Yan et al.,2020),C-O-C(Liu et al., 2011), and adsorbed oxygen species,respectively.This result indicates that O atoms are doped into theframework of g-CgN4. Notably, on the one hand，compared with theOCN, the binding energy of the C 1s, N 1s, and 0 1s in OCM3 have aslight shift toward the higher binding energy.On the other hand,compared with pure MIS, the XPS peaks of Mg 1s, In 3d and s 2p in OCM3 exhibit a tiny move toward the lower binding energy, implyingthat after the hybrid of OCN and MIS, the electrons transferred fromoCN to MIS (Low et al.，2017; Xu et al.,2020). This electron transferpathway is the same as direct Z-scheme heterojunctions, which couldpromote the separation of the photoinduced charge carriers.