



**FIGURE 10.16**

The photoelectron spectrum of methane. The two bands observed in the photoelectron spectrum reflect the ionization of electrons from the  $1t_2$  and  $2a_1$  molecular orbitals. The energy difference between these two bands corresponds to the energy difference between the  $1t_2$  and  $2a_1$  molecular orbitals (see Figure 10.15). The bands are broad because ionization occurs to many different vibrational levels of the molecules.