

21. Let f_{24} be the abundance of ^{24}Mg , let f_{25} be the abundance of ^{25}Mg , and let f_{26} be the abundance of ^{26}Mg . Then, the entry in the periodic table for Mg is $24.312 = 23.98504f_{24} + 24.98584f_{25} + 25.98259f_{26}$. Since there are only three isotopes, $f_{24} + f_{25} + f_{26} = 1$. We solve for f_{25} and f_{26} . The second equation gives $f_{26} = 1 - f_{24} - f_{25}$. We substitute this expression and $f_{24} = 0.7899$ into the first equation to obtain $24.312 = (23.98504)(0.7899) + 24.98584f_{25} + 25.98259 - (25.98259)(0.7899) - 25.98259f_{25}$. The solution is $f_{25} = 0.09303$. Then, $f_{26} = 1 - 0.7899 - 0.09303 = 0.1171$. 78.99% of naturally occurring magnesium is ^{24}Mg , 9.30% is ^{25}Mg , and 11.71% is ^{26}Mg .