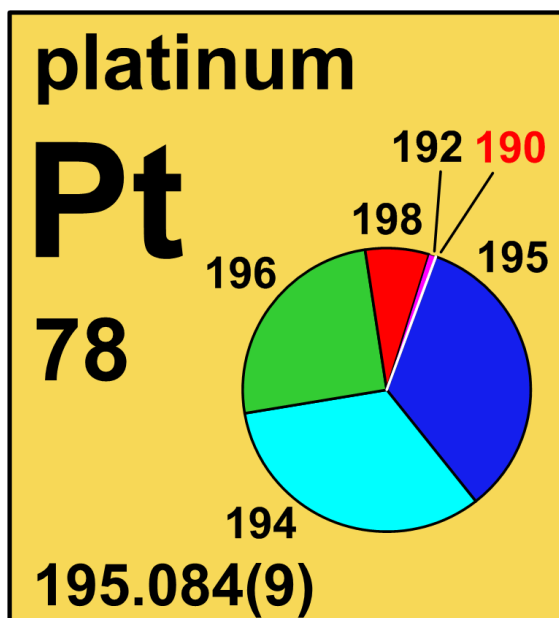


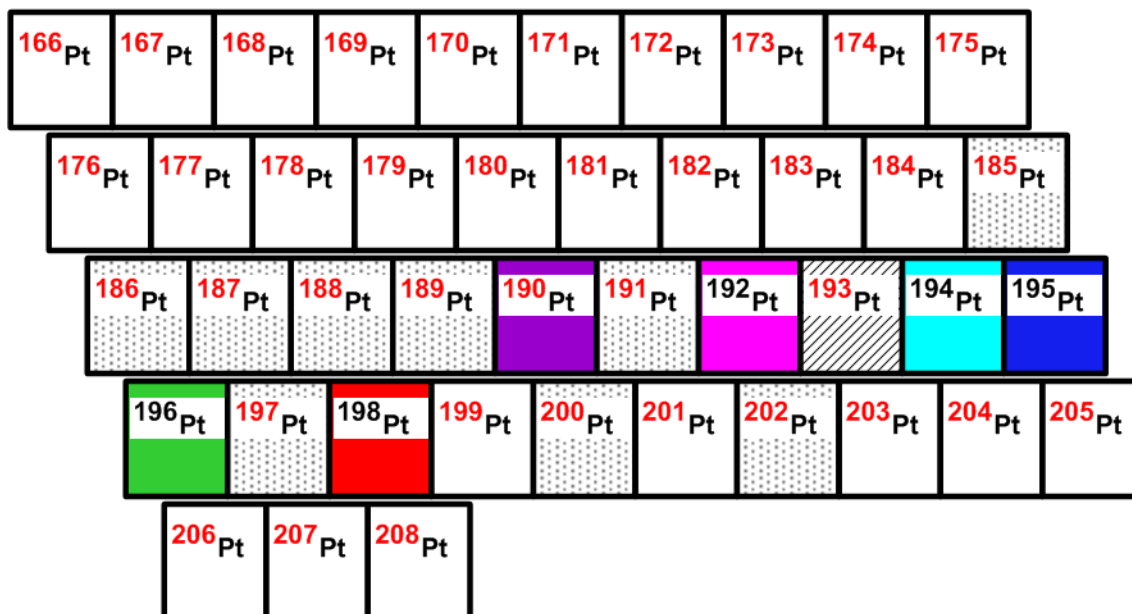
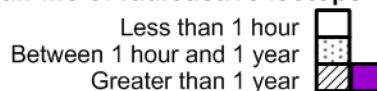
4.78 platinum



Stable isotope	Relative atomic mass	Mole fraction
$^{190}\text{Pt}^\dagger$	189.959 93	0.000 12
^{192}Pt	191.961 04	0.007 82
^{194}Pt	193.962 681	0.328 64
^{195}Pt	194.964 792	0.337 75
^{196}Pt	195.964 952	0.252 11
^{198}Pt	197.967 89	0.073 56

† **Radioactive isotope** having a relatively long **half-life** (4.9×10^{11} years) and a characteristic terrestrial **isotopic composition** that contributes significantly and reproducibly to the determination of the **standard atomic weight** of the **element in normal materials**.

Half-life of radioactive isotope



4.78.1 Platinum isotopes in Earth/planetary science

Astrophysicists have confirmed an anomaly in the **isotopic composition** of platinum in the chemically peculiar HgMn star χ Lupi, and the platinum isotopic composition was shown to be a mixture of ^{196}Pt and ^{198}Pt (Figure 4.78.1) [523].

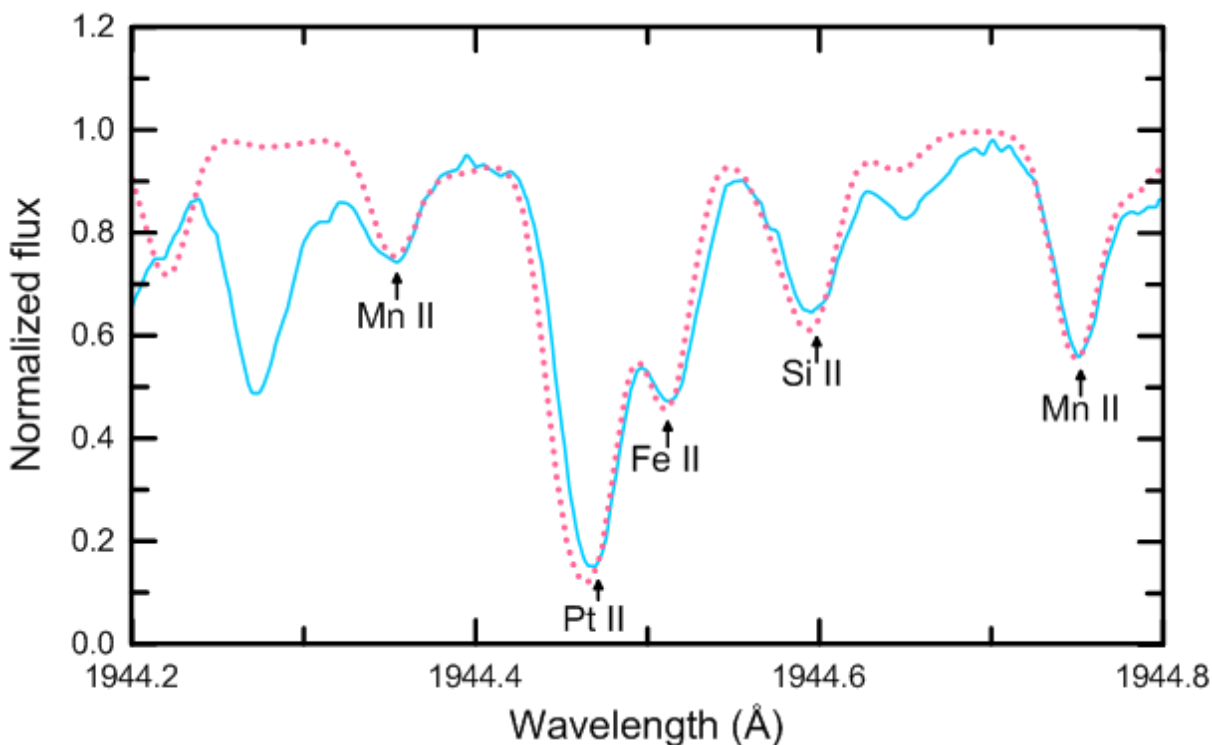


Fig. 4.78.1: Observed spectra of the chemically peculiar HgMn star χ Lupi (solid blue line) compared to a synthetic spectra calculated with a mixture of 70 percent ^{196}Pt and 30 percent ^{198}Pt (dotted pink line) (modified after [523]).

4.78.2 Platinum isotopes in geochronology

The decay of ^{190}Pt to ^{186}Os over time has been used for dating rocks and iron **meteorites** [524].

4.78.3 Platinum isotopes in medicine

$^{195\text{m}}\text{Pt}$ (with a half-life of 4 days) is used for **pharmacokinetic** studies of platinum-based anti-tumor agents in cancer diagnosis and cancer therapy [185]. The m the superscript of $^{195\text{m}}\text{Pt}$ indicates a **metastable isotope**. $^{195\text{m}}\text{Pt}$ can be produced from the **stable isotopes** ^{192}Os or ^{195}Pt via the $^{192}\text{Os}(\alpha, n)^{195\text{m}}\text{Pt}$ reaction and the $^{195}\text{Pt}(n, n')^{195\text{m}}\text{Pt}$ reaction, respectively.