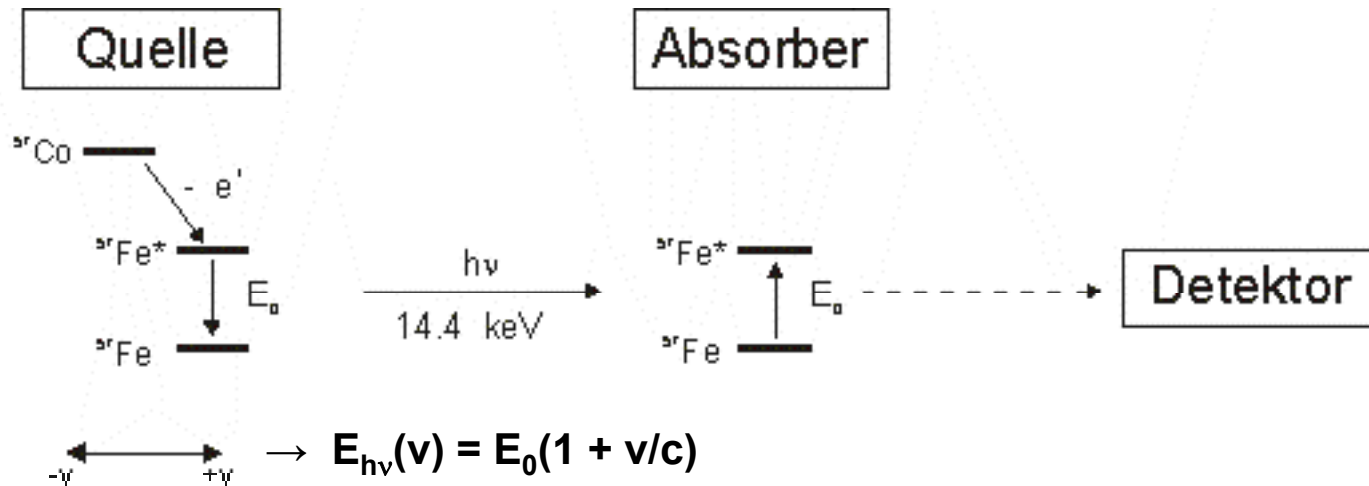


# <sup>57</sup>Fe-Mößbauer-Spektroskopie - Messprinzip

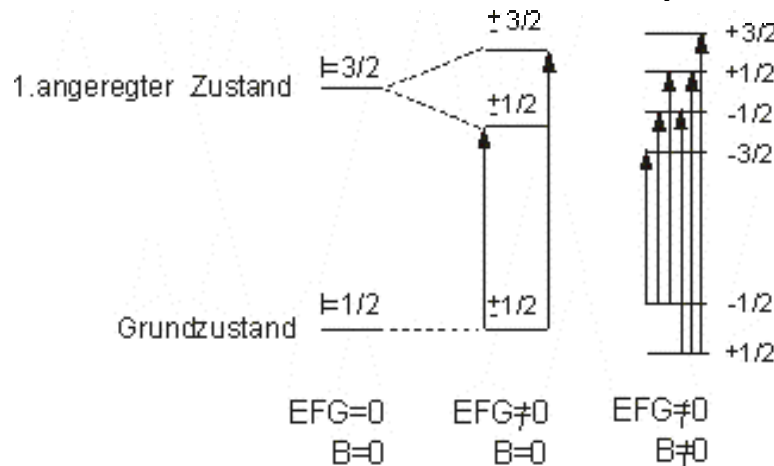


Quelle:

Radioaktives <sup>57</sup>Co → <sup>57</sup>Fe\* (I = 3/2) → <sup>57</sup>Fe (I = 1/2)

Absorber:

Probe mit <sup>57</sup>Fe (I = 1/2, m<sub>I</sub> = ±1/2) → <sup>57</sup>Fe\* (I = 3/2, m<sub>I</sub> = ±1/2, ±3/2)



## Begriffe in der Mößbauer-Spektroskopie

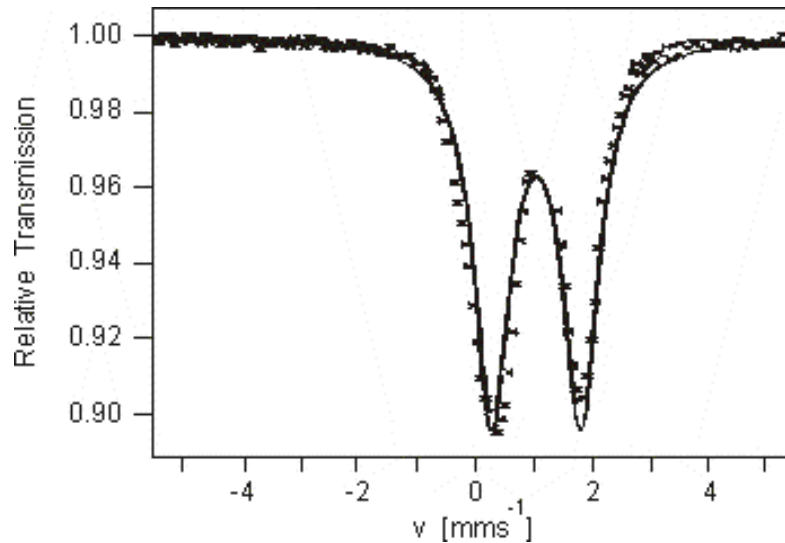
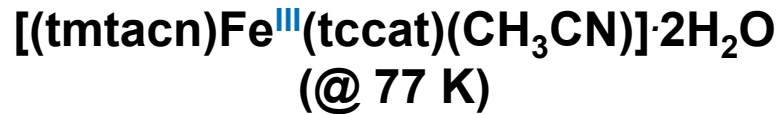
EFG = Elektrischer Feldgradient

B [T] = Externes Magnetfeld

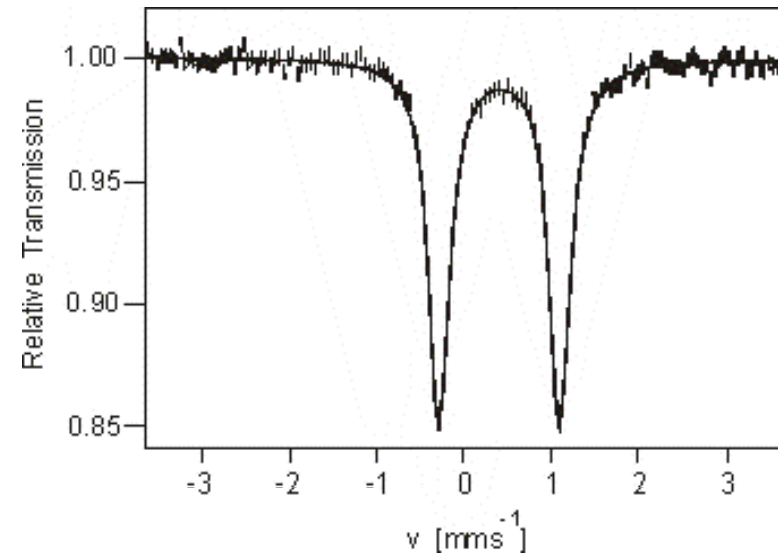
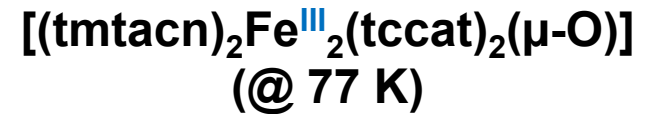
$\delta$  [mms<sup>-1</sup>] = Isomerieverschiebung  
(Resonanzfrequenz)

$|\Delta E_Q|$  [mms<sup>-1</sup>] = Quadrupolaufspaltung  
(Größe hängt vom EFG am Atomkern ab)

# $^{57}\text{Fe}$ -Mößbauer-Spektroskopie - Beispiele



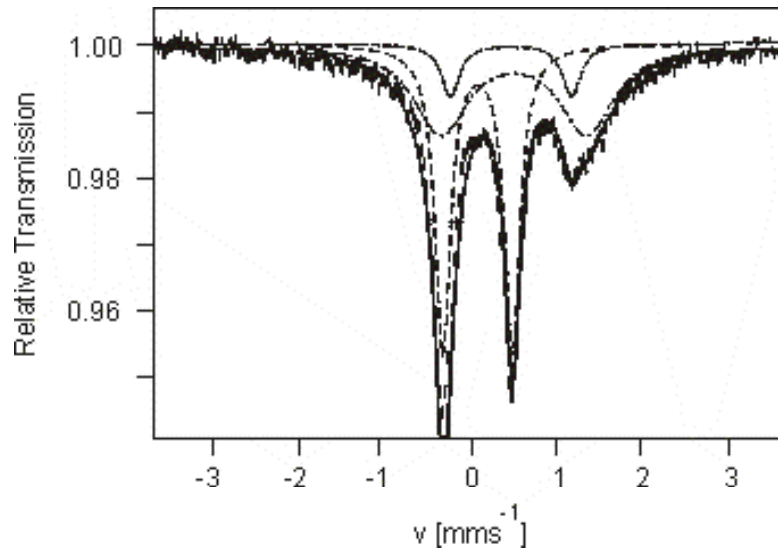
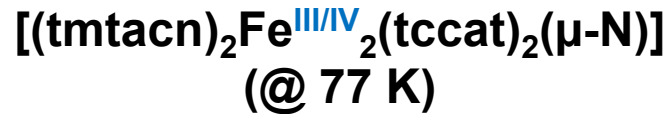
$$\delta = 1.06 \text{ mms}^{-1}$$
$$|\Delta E_Q| = 1.54 \text{ mms}^{-1}$$



$$\delta = 0.40 \text{ mms}^{-1}$$
$$|\Delta E_Q| = 1.38 \text{ mms}^{-1}$$

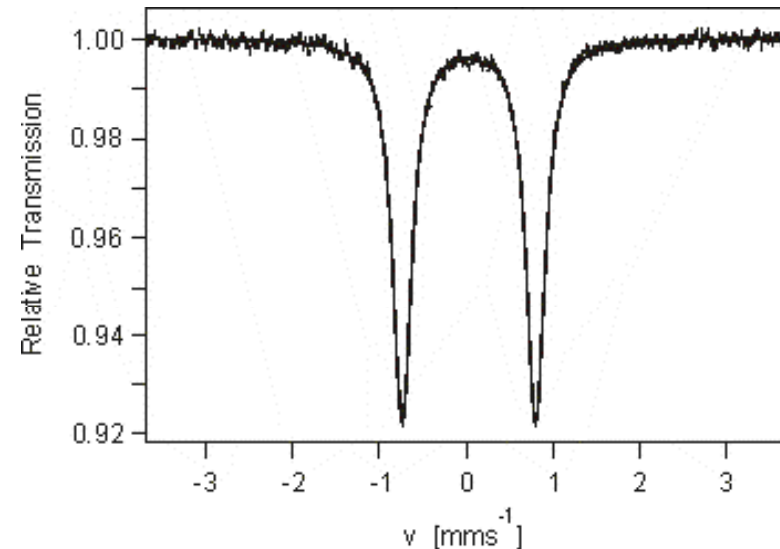
**tmtacn = 1,4,7-Trimethyl-1,4,7-triazacyclononan**  
**tccat = Tetrachlorocatechol**

# $^{57}\text{Fe}$ -Mößbauer-Spektroskopie - Beispiele



$$\delta = 0.52 \text{ mms}^{-1} (\text{Fe}^{\text{III}}), 0.09 \text{ mms}^{-1} (\text{Fe}^{\text{IV}})$$

$$|\Delta E_{\text{Q}}| = 1.67 \text{ mms}^{-1} (\text{Fe}^{\text{III}}), 0.81 \text{ mms}^{-1} (\text{Fe}^{\text{IV}})$$



$$\delta = 0.04 \text{ mms}^{-1}$$

$$|\Delta E_{\text{Q}}| = 1.55 \text{ mms}^{-1}$$

tmtacn = 1,4,7-Trimethyl-1,4,7-triazacyclononan  
tccat = Tetrachlorocatechol