Attributes of Moderator Materials

1.) **High scattering cross section**

2.) **Low absorption cross section**

3.) **High ξ=ln (E_1/E_2) energy loss/collision**

$$\xi = 1 + \frac{(A-1)^2}{2A} \ln \frac{A-1}{A+1}$$

$$\xi \approx \frac{2}{A + \frac{2}{3}} \quad for.\ A > 2$$

Slowing Down Power = SDP=$\xi N \sigma_s = \sum_s \xi$

Moderating Ratio =MR = $\frac{\sum_s \xi}{\sum_a}$

Moderator	SDP, cm^{-1}	Mod Ratio	Comments
H_2O	1.53	72.	
D_2O	0.37	12,000.	≈ 100 $/kg
He (STP)	0.000016	83.	low ρ
Be	0.176	159.	≈ 200 $/kg
C	0.64	170.	
$ZrH_{1.79}$	0.8	56.	