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ISOMER SHIFT REFERENCE SCALES<sup>+</sup>

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One of the current activities of the Mössbauer Effect Data Center is an evaluation of the isomer shift values for materials commonly used as sources and absorber standards. This is being done for the nineteen Mossbauer transitions listed in the table. Having an isomer shift conversion scale, one can convert isomer shift data from any laboratory to a desired source or absorber material for comparison or other use of the data.

We are attempting to consider all pertinent published or communicated data in our evaluation. The process of turning data into isomer shift scales has three stages. First the data is evaluated to eliminate any which have known or obvious errors. Second-order Doppler shift corrections and/or corrections due to dispersion are made when appropriate. Next a weighted

mean of isomer shift difference between pairs of materials is determined. The final stage is the determination of best values for the isomer shift conversions by the method of least squares. The uncertainties in the isomer shifts are dependent on which material is chosen as the standard. It is not correct to change to different standards by simply subtracting the isomer shift of this new standard from each of the isomer shift values in the old scale and then propagating the uncertainties. This procedure assumes that each of the isomer shift values in the scale is an independent measurement. By our method of determining these values, every one should be dependent on all the others and in determining the uncertainties for a scale based on a new standard, this covariance must be considered.

Table. Mössbauer transitions for which isomer shift reference scales are being evaluated.

<sup>57</sup> Fe (14.1 keV)	<sup>149</sup> Sm (22.5 keV)	<sup>169</sup> Tm ( 8.4 keV)
<sup>99</sup> Ru (89.4 keV)	<sup>151</sup> Eu (21.5 keV)	<sup>170</sup> Yb (84.3 keV)
<sup>119</sup> Sn (23.9 keV)	<sup>153</sup> Eu (103.2keV)	<sup>181</sup> Ta ( 6.2 keV)
<sup>121</sup> Sb (37.2 keV)	<sup>155</sup> Gd (86.5 keV)	<sup>193</sup> Ir (73.0 keV)
<sup>125</sup> Te (35.5 keV)	<sup>161</sup> Dy (25.6 keV)	<sup>197</sup> Au (77.3 keV)
<sup>127</sup> I (57.6 keV)	<sup>166</sup> Er (80.6 keV)	<sup>237</sup> Np (59.5 keV)
<sup>129</sup> I (27.8 keV)		

<sup>+</sup> Full text to appear in Mössbauer Effect Reference and Data Journal.