The monoclinic silicates $\text{Lu}_2\text{SiO}_5$ and $\text{Sc}_2\text{SiO}_5$ (Y$_2$SiO$_5$ type, space group $C2/c$) form a solid solution $\text{Lu}_{2-x}\text{Sc}_x\text{SiO}_5$. Samples with $x = 0.5, 0.8, 1.0$ were synthesized ceramically from $\text{Lu}_2\text{O}_3$, $\text{Sc}_2\text{O}_3$, and $\text{SiO}_2$. The structures of three crystals with $x = 0.88, 0.77$, and 0.50 were refined on the basis of single-crystal X-ray diffraction data. The rare earth (RE) atoms occupy two crystallographically different $8f$ sites with oxygen coordination numbers (CN) of 6 ($RE2$) and 7 ($RE1$). Refinements of the occupancy parameters showed Lu/Sc mixing for both sites with a strong preference of the smaller scandium atoms for CN6.

Key words: Crystal Structure, Solid Solution, Silicate