$$\text{mol\% Al}_2\text{O}_3 = \left[\dfrac{\dfrac{100 - 2y}{2}}{\dfrac{100 - 2y}{2} + (50 + 2y)} \right] \times 100$$

If we solve for y when the mol% of $\text{Al}_2\text{O}_3 = 39$, then $y = 7.91$. Thus, 7.91 O^{2-} vacancies are produced in the original material that had 200 O^{2-} ions. Therefore, the percentage of vacancies is just

$$\text{\% vacancies} = \dfrac{7.91}{200} \times 100 = 3.96\%$$