12.33 (a) For a $Cu^{2+}O^{2-}$ compound in which a small fraction of the copper ions exist as Cu^+, for each Cu^+ formed there is one less positive charge introduced (or one more negative charge). In order to maintain charge neutrality, we must either add an additional positive charge or subtract a negative charge. This may be accomplished be either creating Cu^{2+} interstitials or O^{2-} vacancies.

(b) There will be two Cu^+ ions required for each of these defects.

(c) The chemical formula for this nonstoichiometric material is $Cu_{1+x}O$ or CuO_{1-x}, where x is some small fraction.