



Figure 3.2 X-rays are reflected off of the parallel planes of the layered structure. These reflections may then be converted to the interlayer spacing,  $d$ , by using Bragg's equation.

by recent results from an analysis of stratum corneum lipids (18). The interlayer spacings versus water content for different combinations of lipids from the stratum corneum spectrum (18) are shown in Figure 3.3.

The basic feature of the x-ray diffraction evaluation is the location of an added substance, as directly reflected in the change of interlayer spacing, as a function of the amount of substance added (Fig. 3.4). Location of the added substance between the lipid chains (see Fig. 3.4(a)) leads to no interlayer spacing change, whereas localization to the space between the methyl group layers (Fig. 3.4(b)) (or in the aqueous layer) leads to a strong increase in spacing.

With knowledge of this relationship, a cursory glance at the results in Figure 3.3 may be given a straightforward (but erroneous) interpretation. It would predict that the layered structure of the stratum corneum free fatty acids plus water will accommodate added phosphatidylethanolamine, mostly between the methyl groups, and that a subsequent addition of cholesterol will be localized to the same site.