factors affcting some physical properties of anon crystalline solid (vanadium and phosphours)oxides

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This work has been proposed to study the effect of composition on the physical properties of vanadium phosphate glasses.1. The prepared samples with compositions of(V205)1-x(P205)x, (where x = 0.12, 0.18, 0. and (V205)0.76-y(P205)0.24(A)y, (where Ay=(Fe203)0.015’ (Fe203)0.05, (ZnO)0.17 and showed a glassy structure, while the compos24 and 0.30)(Fe 0)2 3 0.003’(Co0)0.10) ition of x =0.06 showed crystalline structure.2.The DTA of the glasses showed characteristic crystallization temperatures depending on the composition of the glasses.3.The glasses did not dissociate thermally over a temperature range from room temperature to 573 K.4.The orthorhombic V205 and P205 crystalline phases have been formed in all heat treated glasses at 573 °K for 15 hours.5.The IR results indicated that V5+ exists in six fold coordination in all glasses. The heat treatment for the samples gave an evidence of the formation of new phases such asp - PVO5.6.All the samples showed the presence of V4+. The concentration of this ion decreased with increasing the content of V205 in the samples and increased by annealing.7.The electrical conductivity value varies with the composition of the glass and increases by annealing.8.The electronic conductivity of the glasses is governed by the presence of transition metals in the glasses in two different valency states. The conductivity in these glasses arises through electron transfer from a lower to a higher valency state ion, e.g. from V4+ toV5+.9.The rate of crystallization depends on the composition of the glasses and affects by adding foreign ions to the base glasses. The crystallization in all glasses is a one dimensional process10.The threshold voltage, Vth, decreased while the threshold current, 1th, increased with increasing the content of V205 in the glass. The same behaviour was also observed by increasing the ambient temperatures.11.The threshold power, Pth’ showed very little variation-with changing the ambient temperatures.12.As the sample thickness increased both the Vth and Pth’ at the turn - over point in the conduction path, increased.13.The switching data was explained on the basis of thermal and electrothermal models.