SDI Review Form 1.6

Journal Name:	**Physical Science International Journal**
Manuscript Number:	**Ms_PSIJ_41102**
Title of the Manuscript:	**Identity that Connects Thermal Expansion and Isothermal Compressibility is Not an Identity for Condensed Phases**
Type of the Article	**Short Research Article**

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

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PART 1: **Review Comments**

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments	**The identity in Eq. (3) is not true. See demonstration** Suppose the state equation $S=S(U,V)$ (a) ; $dS=\left(\frac{\partial S}{\partial U}\right)_V dU+\left(\frac{\partial S}{\partial V}\right)_U dV$ (b) Now consider the state equation $U=U(T,V)$ (c) ; $dU=\left(\frac{\partial U}{\partial T}\right)_V dT+\left(\frac{\partial U}{\partial V}\right)_T dV$ (d) Combining (b) and (d) $dS=\left(\frac{\partial S}{\partial U}\right)_V\left(\frac{\partial U}{\partial T}\right)_V dT+\left[\left(\frac{\partial S}{\partial U}\right)_V\left(\frac{\partial U}{\partial V}\right)_T+\left(\frac{\partial S}{\partial V}\right)_U\right]dV$ (e) Also consider the state equation $S=S(T,V)$ (f) ; $dS=\left(\frac{\partial S}{\partial T}\right)_V dT+\left(\frac{\partial S}{\partial V}\right)_T dV$ (g) Comparing the equations (e) and (g) $\left(\frac{\partial S}{\partial V}\right)_T=\left(\frac{\partial S}{\partial V}\right)_U+\left(\frac{\partial S}{\partial U}\right)_V\left(\frac{\partial U}{\partial V}\right)_T$ (h) From the relation $dS=\frac{1}{T}dU+\frac{p}{T}dV$ (i) Compared with equation (b) $\left(\frac{\partial S}{\partial U}\right)_V=\frac{1}{T}$ (j) and $\left(\frac{\partial S}{\partial V}\right)_U=\frac{p}{T}$ (k) Putting the equation (j) in (h) $\left(\frac{\partial S}{\partial V}\right)_T=\left(\frac{\partial S}{\partial V}\right)_U+\frac{1}{T}\left(\frac{\partial U}{\partial V}\right)_T$ (l) Also from (i) and the Maxwell relation $\left(\frac{\partial U}{\partial V}\right)_T=T\left(\frac{\partial S}{\partial V}\right)_T-p=T\left(\frac{\partial p}{\partial T}\right)_V-p$ Therefore, $\left(\frac{\partial S}{\partial V}\right)_T\neq\left(\frac{\partial S}{\partial V}\right)_U$. So the identity $\frac{\alpha}{\beta}=\frac{P}{T}$ is derivate from a wrong assumption. At line 104: $\frac{C_p}{C_V}=\frac{\beta}{\beta_s}=\frac{B_s}{B}$	
Minor REVISION comments	At line 33: From Eqs. (1), (2), and (3) and the combination of the first and the second laws of thermodynamics	
Optional/General comments		

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